

Regional guide for the Pacific Northwest Region : covering Forest Service programs that affect the states of Oregon, Washington, and portions of California and Idaho.

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Regional Guide for the Pacific Northwest Region

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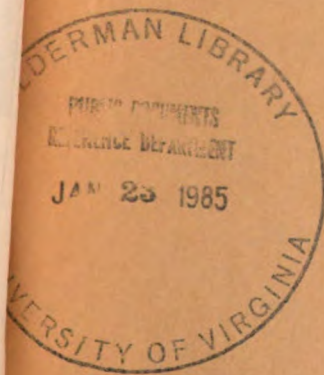
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**REGIONAL GUIDE
FOR THE
PACIFIC NORTHWEST REGION**

**Covering Forest Service programs
that affect the States of Oregon, Washington,
and portions of California and Idaho**

May 1984

**Pacific Northwest Region
USDA, Forest Service
319 SW Pine, Box 3623
Portland, Oregon 97208
(503)221-2387**

Preface

The regulations implementing the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), require the preparation of a Regional Guide and an Environmental Impact Statement for the nine Regions of the National Forest System. This Regional Guide and the Final EIS are treated as combined documents (40 CFR 1506.4).

REGIONAL GUIDE

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Chapter 1

REGIONAL PLANNING

The primary purpose of this Regional Guide is to provide national and Regional direction to the 19 National Forests within the Pacific Northwest Region for land and resource management planning efforts. (See Figure 2-1 in Chapter 2.) The Guide facilitates National Forest planning by providing Regional standards and guidelines for addressing major issues and management concerns and by displaying tentative resource objectives for each National Forest, based on objectives that were assigned to the Region as a whole in the National RPA Recommended Program. While the Guide ensures that a consistent approach to National Forest planning is followed throughout the Region, it allows the individual Forests considerable latitude in their formulation of National Forest Land and Resource Management Plans. The Guide also is intended to help coordinate management of the National Forest System in the Pacific Northwest Region with other Forest Service programs-- programs that assist private landowners and State and local governments in managing and protecting their forest resources, as well as an extensive forestry research program.

PLANNING PROCESS

Regional planning takes place within the overall planning framework structured by the regulations of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), and of the National Environmental Policy Act of 1969 (NEPA). The planning process is based on the 14 planning principles stated in the NFMA regulations (36 CFR 219.1); they are listed on page 1-2.

Forest Service planning is a continuous, iterative process carried out on three levels:

1. National--RPA Assessment and Program (covering both private and public lands)
2. Regional--Regional Guide
3. Local--Forest Land and Resource Management Plans for National Forest System lands; State Forest Resource Plans developed by the States with Forest Service assistance for State and private lands; and research plans

Management direction becomes increasingly specific as planning progresses from the national to the local level. In this structure, Regional planning is a pivotal process for conveying management direction from the national to the local level and for conveying information from the local to the national level.

NATIONAL FOREST PLANNING PRINCIPLES

1. Establishment of goals and objectives for multiple-use and sustained-yield management of renewable resources without impairment of the productivity of the land
2. Consideration of the relative values of all renewable resources, including the relationship of nonrenewable resources, such as minerals, to renewable resources
3. Recognition that the National Forests are ecosystems and their management for goods and services requires an awareness and consideration of the interrelationships among plants, animals, soil, water, air, and other environmental factors within such ecosystems
4. Protection and, where appropriate, improvement of the quality of renewable resources
5. Preservation of important historic, cultural, and natural aspects of our national heritage
6. Protection and preservation of the inherent right of freedom of American Indians to believe, express, and exercise their traditional religions
7. Provisions for the safe use and enjoyment of the forest resources by the public
8. Protection, through ecologically compatible means, of all forest and rangeland resources from depredations by forest and rangeland pests
9. Coordination with the land and resource planning efforts of other Federal agencies, State and local governments, and Indian tribes
10. Use of a systematic, interdisciplinary approach to ensure coordination and integration of planning activities for multiple-use management
11. Early and frequent public participation
12. Establishment of quantitative and qualitative standards and guidelines for land and resource planning and management
13. Management of National Forest System lands in a manner that is sensitive to economic efficiency
14. Responsiveness to changing conditions of land and other resources and to changing social and economic demands of the American people

National RPA Assessment and Program

Every 10 years, a comprehensive, nationwide assessment is made of the forest and rangeland renewable resources in the United States. Using information generated at the local and Regional levels, this RPA Assessment covers timber, range, water, wildlife and fish, outdoor recreation, and wilderness. Short- and long-range projections are made of future supply and demand for each of these resources. The findings are then used to help determine the desired level of future outputs from Forest Service programs. Alternative levels of outputs and associated costs are examined in the RPA Program, which is prepared every 5 years. Based on an analysis of these alternatives and consideration of public views, the Secretary of Agriculture selects a National RPA Recommended Program for the Forest Service. Included in this Program is the distribution of nationwide resource objectives among the eight Regions of the National Forest System. The Recommended Program and a Presidential Statement of Policy are transmitted to Congress, which may accept or revise the Statement of Policy. The final Statement of Policy and Program together guide the planning and development of future Forest Service budget proposals. Actual program implementation is directed by annual appropriations.

Regional Guides

Regional planning links the RPA Assessment and Program with local Forest and State planning. It plays a dual role by channeling management direction from the national to the local level and information from the local to the national level.

The Regional Guide communicates national and Regional direction for National Forest planning, as well as information pertinent to the development of State Forest Resource Plans and research activities. Specifically, the Regional Guide serves the following purposes:

1. It provides standards and guidelines for various management activities that may be carried out on the National Forests. These standards and guidelines specify the actual criteria to be applied to the management activities.
2. It provides planning direction for developing individual Forest Plans, including the range of alternatives to be considered by the Forests. Planning direction essentially defers the final decision on an issue to the individual Forest, within limits established by the Region.
3. It displays the Regional RPA Program and distributes tentative resource targets among the individual National Forests. While RPA-assigned objectives for the Region are firm as a whole, individual National Forest objectives are merely used as the basis for one of the alternatives examined in the Forest planning process.
4. It reflects the general coordination of National Forest System programs, State and Private Forestry programs, and research programs.

This Regional Guide is based primarily on 1980 data. It is subject to change as new and better data on biological capabilities and on social, economic, and environmental effects become available through the National Forest and State planning processes. Local plans and other available information will be analyzed to develop better estimates of Regional capability. Using this information, Regional line officers will provide input into the nationwide RPA process; they are members of the Forest Service decision-making group that develops the National RPA Assessment and Program and ultimately negotiates with the Chief of the Forest Service for the Regional share of the RPA Program.

Local Plans

By collecting and integrating basic data on biological potential, resource inventories, and research problems, local plans (National Forest Land and Resource Management Plans and State Forest Resource Plans) are the building blocks for Regional and national planning. The National Forest and State Forest Resource Plans now being developed will play an important role in shaping the next RPA Program (in 1985) and the next RPA Assessment in (1990).

National Forest land and resource management planning considers a broad range of reasonable management alternatives. To the extent practicable, Forest Plan alternatives reflect the full range of major commodity and environmental resource uses and values that could be produced from the Forest. All alternatives are formulated to provide different ways of addressing the major public issues, management concerns, and resource opportunities identified during the planning process. At least one alternative is designed to meet the Forest's tentatively assigned share of the 1980 RPA Program; others have resource outputs that are above or below the RPA Program levels. The emphasis in both the Program and National Forest planning is on the future and how Forests can best be used and managed to meet people's needs.

Forest Plans ordinarily are to be revised on a 10-year cycle. They must be revised at least every 15 years. A Plan may also be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the Plan have changed significantly or when changes in RPA policies, goals, or objectives would have a significant effect on Forest level programs. The Forest Supervisor will review the conditions that might require revision of the Forest Plan at least every 5 years.

Program Development and Budgeting

By providing objectives, output targets, and standards and guidelines, the RPA Program, Regional Guides, and Forest Plans direct what should be done in the National Forest System over the next 50 years. They also include estimated costs of implementing the Plans based on the best information available. The Plans and Guides are not developed to conform with annual budgets, but rather are the basis for annual Forest Service budgeting proposals. The rate of implementation depends on the funding and work force made available to the Forest Service through the annual Federal budgeting and appropriation processes.

The annual budgeting process provides an opportunity for the Forest Service to reflect current conditions and changes that may have occurred since the RPA Program was developed. Several budget levels are prepared for National Forest System Regions, research stations, and State and Private Forestry programs. Budget proposals that deviate from the RPA Recommended Program are explained and justified. Budget proposals are firm commitments by these units to achieve a certain level of output targets at a specific cost. During the budgeting process, these proposals are frequently adjusted because of changing conditions and administrative and congressional priorities. Such adjustments are within the scope of the Regional Guides and National Forest Plans. The actual appropriated budget becomes a firm contract of work for which the Forest Service is held accountable.

Fiscal year 1981 was the first year of the 1980 RPA Program. The distribution of fiscal year 1981 and 1982 funds was based upon existing resource and land management plans, the best cost opportunities, local demands and conditions, historical trends, and expected outputs. By fiscal year 1984, the Forest Service expects new National Forest Plans to play an important role in program and funding distribution.

PLANNING FOR THE PACIFIC NORTHWEST REGION

A basic objective of planning is to set goals and to establish a course to reach them. The first step is determining the present situation relative to those goals, followed by identifying the options available to reach them, given the present situation. To accomplish this, the interdisciplinary team appointed by the Regional Forester solicited the views of the public and the concerns of National Forest managers, analyzed existing forest and rangeland conditions, and made projections of trends and consequences based on the continuation of current management direction.

Through the analysis of the management situation described in Chapter 2, opportunities were identified to address national and Regional issues and concerns by changing or establishing policies, modifying current management practices, and altering or establishing resource standards and guidelines. National public issues and management concerns have been formulated as planning questions, and their disposition is presented in Appendix B of the Final EIS. Chapter 3 of this Regional Guide provides planning guidance and management direction for those issues and concerns that can best be addressed at the Regional level.

The analysis of the management situation also identified several opportunities for private and non-Federal forests and rangelands. Chapter 4 covers the analysis of State and Private Forestry. Research needs identified in Chapter 5 will further add to the technical knowledge required to resolve these major management problems, as well as other resource management problems.

Documents and files (planning records) chronicle the Regional planning process and are available for public inspection at the Pacific Northwest Regional Office, 319 Southwest Pine, Portland, Oregon, during business

hours. These documents and files are incorporated by reference as provided for in the NEPA implementing regulations (40 CFR 1502.21). The intention is to include them in the planning process. Also included by reference is the Final Environmental Impact Statement on the 1980 Assessment and RPA Program filed with the Environmental Protection Agency on September 26, 1980.

Chapter 2

REGIONAL SITUATION

OVERVIEW

Many factors, such as laws, policies, programs, and budgets, contribute to and affect management direction. However, the extent of changes needed in management direction is usually limited to what is physically possible within the existing natural resource base. That is, the analysis of the management situation requires determining what goods and services--and how many--the planning area covered by the Regional Guide can supply in response to society's demands. To make these determinations, it is necessary to understand the Regional setting in which the proposed standards and guidelines will be implemented. This chapter describes the setting in the Pacific Northwest Region, including the physical, biological, social, and economic characteristics, the natural resources of the National Forests in the Region, and the public issues and opportunities associated with managing these resources.

PHYSICAL AND BIOLOGICAL SETTING

The Pacific Northwest Region includes the States of Oregon and Washington, as well as portions of two counties in northern California and three counties in western Idaho. (See Figure 2-1.) The Region is approximately 500 miles long from north to south and 380 miles wide from east to west for a total area of 105.7 million acres. Of this total, the Forest Service administers 24.5 million acres comprised of 19 National Forests and 1 National Grassland. The Forest Service also assists in the protection and management of 20.5 million acres of other commercial forest lands through cooperative programs with State and local governments and private landowners.

Water, volcanic, and glacial events in the Region have created a great variety of landforms, ranging from coastal dunes and flat grasslands to rolling hills and steep, highly dissected hillsides. The major geological feature in the Region is the Cascade Range, which runs parallel to the Pacific coastline about 100 miles inland. The Coast Range includes lower elevation mountains close to the coastline. Other important land features are the Willamette Valley and Puget Trough. One active volcano, Mount St. Helens, is located on the Gifford Pinchot National Forest. Unstable or potentially unstable soils are extensive on all National Forests west of the Cascades and on the Wenatchee and the Malheur National Forests east of the crest of the Cascades.

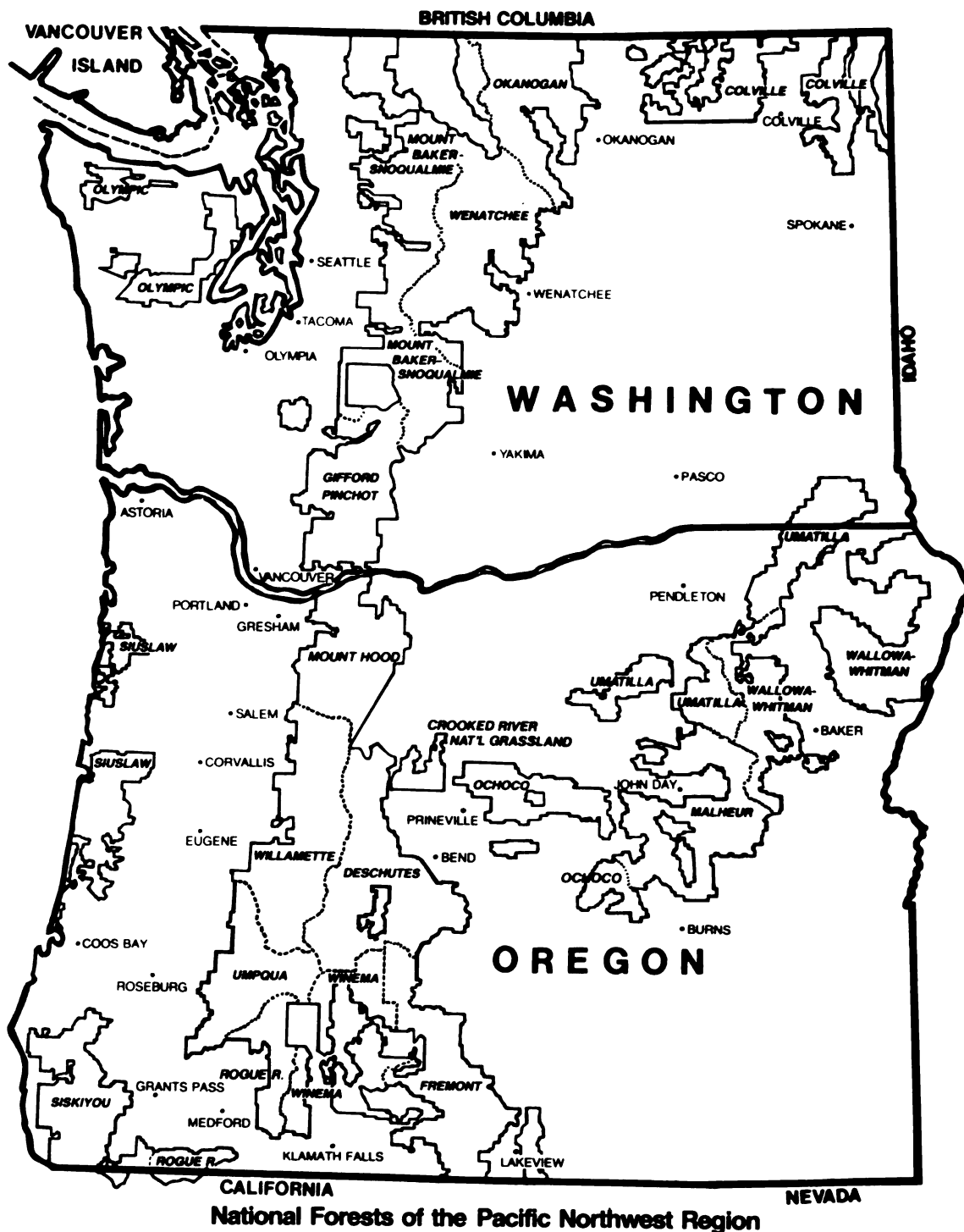


Figure 2-1 The Pacific Northwest Region

Natural vegetation ranges from the Olympic rain forest, characterized by 200 inches of mean annual precipitation, to interior high deserts receiving less than 10 inches mean annual precipitation. The Coast Range and the west slopes of the Cascade Range contain some of the best stands of large sawtimber in the United States. The east slopes of the Cascades and the lower slopes and benches of the interior mountains are covered by open pine forests and juniper. White fir and Douglas-fir associations and mixed conifer forests, such as pine, fir, cedar, Douglas-fir, and larch, are found on the interior mountains above the pine zone and on north slopes. Grasslands and desert shrubs extend into the forests in the basins, uplands, and plains areas, where rainfall is even lighter.

Soil depth, texture, and productivity vary throughout the Region. Some of the deepest, most productive forest soils are found in the lower and gentler slopes of the Cascades below the 2,000-foot elevation and in the Coast Range. Such soils are capable of producing 200 cubic feet (1,100 board feet) per acre per year or more of wood growth from Douglas-fir and western hemlock. At mid-to-high elevations, the soils are frequently moderately deep, stony, and occur on steep and very steep slopes. These soils produce from 50 to 150 cubic feet (280 to 840 board feet) per acre per year of wood growth from Douglas-fir, hemlock, and true firs.

In parts of the high Cascades and high plateaus and basins of south-central Oregon there are many acres of soils derived from coarse-textured, volcanic pumice. These areas are characterized by low to moderate productivity for ponderosa pine, lodgepole pine, and firs at the highest elevations. Wood growth on these sites ranges from 10 to 50 cubic feet per acre per year.

Soils developed from volcanic ash are common in the Blue Mountains of northeast Oregon and in northeast Washington. These soils usually are mixed with soils from glacial till in northeast Washington and with residual and colluvial soils from basalt in the Blue Mountains. The ash soils are moderately productive, have high water storage potential, and support inland Douglas-fir and associated species. The basalt-derived soils in the Blue Mountains usually are medium to fine in texture and shallow to moderately deep, with ponderosa pine as the dominant tree vegetation. Wood growth on these soils ranges from 10 to 110 cubic feet per acre per year.

The National Forests in this Region provide habitat for abundant and varied wildlife and fish, with 748 vertebrate species occupying its land and waters. Dominant big-game species are black-tailed deer, mule deer, white-tailed deer, elk, and black bear. Smaller populations of pronghorn, bighorn sheep, and mountain goats also are found in the Region. Other game species include moose, cougar, rabbit, hare, squirrel, grouse, quail, dove, turkey, chukar, and a variety of waterfowl. Economically important furbearers include beaver, raccoon, bobcat, and coyote. The Region also supports warm- and cold-water fish, including anadromous fish that have both sport and commercial value. Songbirds, birds of prey, reptiles, and amphibians also inhabit the Region. Seven wildlife species and one plant species have been federally designated as endangered in the Region; three other species that exist on National Forests have been federally designated as threatened under the Endangered Species Act.

Although the total water supply in this Region is abundant--more than 100,000 miles of streams and approximately 216,000 surface acres of lakes and reservoirs exist on the National Forests--distribution varies widely, and seasonal flows are low in many streams in some locations. Much of the Region's deep snow pack occurs on National Forests.

The Cascade Range significantly affects the climate of the Pacific Northwest. For example, it reduces the amount of precipitation coming from the Pacific coast that reaches central and eastern Washington and Oregon. Generally, the Region has distinctly wet winters and dry summers; but the areas west of the Cascades, because of their proximity to the Pacific Ocean, have more moderate temperatures and longer, cooler growing seasons.

Storm and flood hazards constitute serious problems for Forests west of the Cascades, notably the Siskiyou and Siuslaw. Storms producing mass movement of soil typically occur at a given location every 4 to 7 years during the winter months and characteristically are of long duration and low intensity. Storm and flood problems are less common east of the Cascades. Erosion and flooding, however, can occur in that area as a result of rain-on-snow or summer thunderstorms.

SOCIAL AND ECONOMIC CHARACTERISTICS

Social Setting

Seventy-one percent of Oregon and Washington's population lives in towns and cities of 2,500 people or more. Seventy-four percent lives in the 18 counties that comprise the State's metropolitan areas. Seventy percent of the total population is concentrated in the narrow strip of counties in both States through which Interstate Highway I-5 runs north and south. Most of the remaining 30 percent live along the coast and east of the Cascades.



Seventy-one percent of the Pacific Northwest's population lives in urban areas.

Between 1970 and 1980, the population of this area grew 22.3 percent. The bulk of this growth is occurring along the I-5 corridor. In nonmetropolitan counties, Oregon and Washington follow the current national trend for population growth, and this trend is expected to continue.

In 1980, racial and cultural minorities constituted a small segment of the total population of Oregon and Washington. Blacks comprised 2 percent of the total population, Hispanics comprised 2 percent, and American Indians comprised 1 percent. Blacks in the Region live predominantly in urban areas; a disproportionate number of American Indians and Hispanics live in rural areas, compared to the States' overall population. Indian Reservations bordering National Forests necessitate coordinated land management.

These population trends and the changing social values and lifestyles that accompany them have significant implications in terms of the kinds of uses and restrictions that people will prefer for management of the National Forests in the Region. The effects of these trends in this Region include the following:

1. Increased residential use of land adjacent to many National Forests, with increased pressure to manage adjacent or visible forest land to emphasize amenities instead of commodities
2. An increased public concern with environmental issues (for example, air and water quality, the presence of chemicals and noise) on a daily, local basis; and the attendant management problems of adjacent residential and Forest uses, such as fire and harvest.
3. A general increased preference for forest land amenities, such as unregulated, unstructured recreation, even when in conflict with economic growth
4. Increased use of Forest resources for personal "semi-market" goods (for example, firewood, fish and game, other food, and building materials)
5. A growing demand for marketable Forest goods for construction and domestic use, a trend intensified by the increasing demand for these natural products

Economic Setting

The Pacific Northwest historically has been a major exporter of timber, agricultural products, and fish. Forest products are especially important to all levels of the Regional economy, with approximately 44 percent of Oregon's economy and 28 percent of Washington's economy directly dependent on Forest resources. Thus, changes in the national demand for Forest products significantly affect employment in Oregon and Washington.

While timber and agricultural products are expected to continue to play a significant role in the Regional economy, economic diversification is occurring in the Region. The primary centers of growth and diversification

are in the Puget Sound-Seattle, Spokane, and Willamette Valley-Portland metropolitan areas. However, there are many commodities and services for which the area is not self-sufficient and still lags behind national trends. This is the case for many rapidly growing businesses, such as electronics and services.

Projections published by the Bureau of Economic Analysis, U.S. Department of Commerce¹ indicate that the populations of both Oregon and Washington will continue to grow at the rate of 6 to 7 percent per decade, while total employment is expected to grow at about 9 to 10 percent per decade and income at about 50 percent per decade. Despite the rapid growth in personal income, per capita income in Oregon is expected to remain below the national average and increase only slightly; and it is expected to remain above the national average, but decrease slightly in Washington.

RESOURCE ELEMENTS

Overview

Issues and Limiting Factors

In the years following World War II, demands for National Forest timber increased rapidly. As a result, road construction increased rapidly, principally to provide access to timber for harvest. The improved access also helped to generate a rapid increase in the use of these lands for all forms of forest recreation. Besides containing a significant portion of the commercial forest land and standing timber volumes, the National Forests in the Region are a principal location for wildlife habitats, fisheries, and recreational pursuits; they contain the headwaters for most of the major river systems in the Region; and they contain the watersheds for many power and irrigation impoundments and domestic water sources.

As management activities and public use intensified throughout the National Forests, conflicts arose between major types of uses, thereby creating the current issues and management concerns that drive this planning process. Currently, demand for the various goods and services is nearing the biological and physical capability of the land as it is being managed.

To help determine the capability for change within the physical limits of natural resources on the Region's National Forests, resource inventories were reviewed. This review focused on inventory features related to the issues and concerns identified for resolution in this Regional Guide. (See Table 2-1.)

¹"OBERS" (Office of Business Economics, currently Bureau of Economic Analysis, Department of Commerce; Research Service, Department of Agriculture) projections were selected because they are national projections, which facilitate comparisons of Regional, interregional, and national population growth.

Table 2-1

Inventory of Features, Pacific Northwest Region

Features	Thousands of Acres ¹
Reserved and Deferred ²	3,724
Productive Forest Land ³	16,274
Presently Undeveloped (Roadless)	4,078
High Risk Soils	4,774
Retention for Visual Management	3,505
Partial Retention for Visual Management	7,122
Threatened and Endangered Species Habitat	443
Big-Game Winter Range	4,309
Old-Growth Timber	3,889

¹Acres do not equal the total National Forest inventory, because many features are found on the same acres.

²Includes Research Natural Areas and Wilderness.

³Excludes Productive Reserved and Deferred Acres.

Of particular interest in the Region is the upper limit of timber production and grazing capability of the National Forests. Some consider these two resources to be commodity or "market" resources that have a well-established marketplace value, while outdoor recreation, wilderness, and wildlife habitat are considered "nonmarket" resources that do not have a well-established and defined marketplace value.

Outputs were calculated for timber, wilderness, primitive recreation, dispersed recreation, wildlife, and livestock forage. (See Figure 2-2.) To define the range of output capability, it is necessary to make some assumptions about how land can be used to produce goods and services. One assumption emphasizes market valued resources, the other set emphasizes non-market resources.

General assumptions for the market emphasis include the following:

1. All productive Forest land is available for intensive management directed primarily at the production of wood fiber, except those acres of productive Forest land reserved and deferred and those acres of productive Forest land identified as Threatened and Endangered Species Habitat.
2. Yields will be based on a high investment intensity of management for timber that also results in high outputs of grazing forage and certain types of dispersed recreation.

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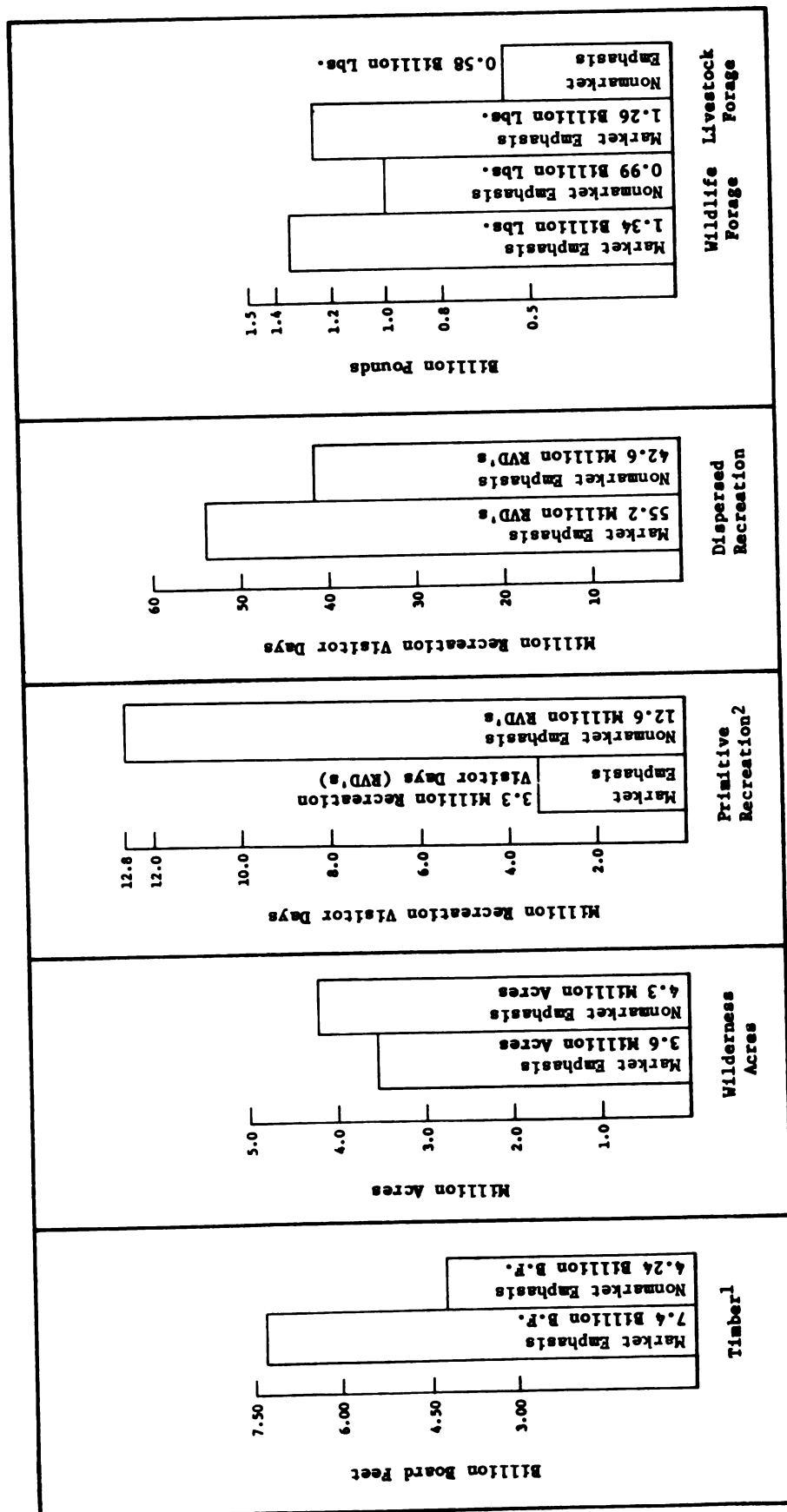
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¹Includes chargeable and nonchargeable volumes.

²Includes recreation available from wilderness and roadless areas.

Figure 2-2. Range of Resource Outputs Reflecting Management Emphasis For The Pacific Northwest Region for the Year 2030

3. All other acres are available, first, for the highest forage-producing management prescriptions, and, second, for the highest recreation-producing management prescriptions. The Roadless Area Review and Evaluation (RARE II) further planning areas are assumed to be available for nonwilderness uses.¹

General assumptions for the nonmarket emphasis include the following:

1. RARE II further planning areas are assumed to be available for wilderness management.¹
2. Priority is given to managing acres for soil stability, visual resources, old-growth timber, primitive recreation, wildlife habitat, and dispersed recreation.

The following sections describe the Pacific Northwest Region's current management situation by resource management areas and programs and include an assessment of the Region's capabilities and opportunities to address public issues and management concerns.

Recreation

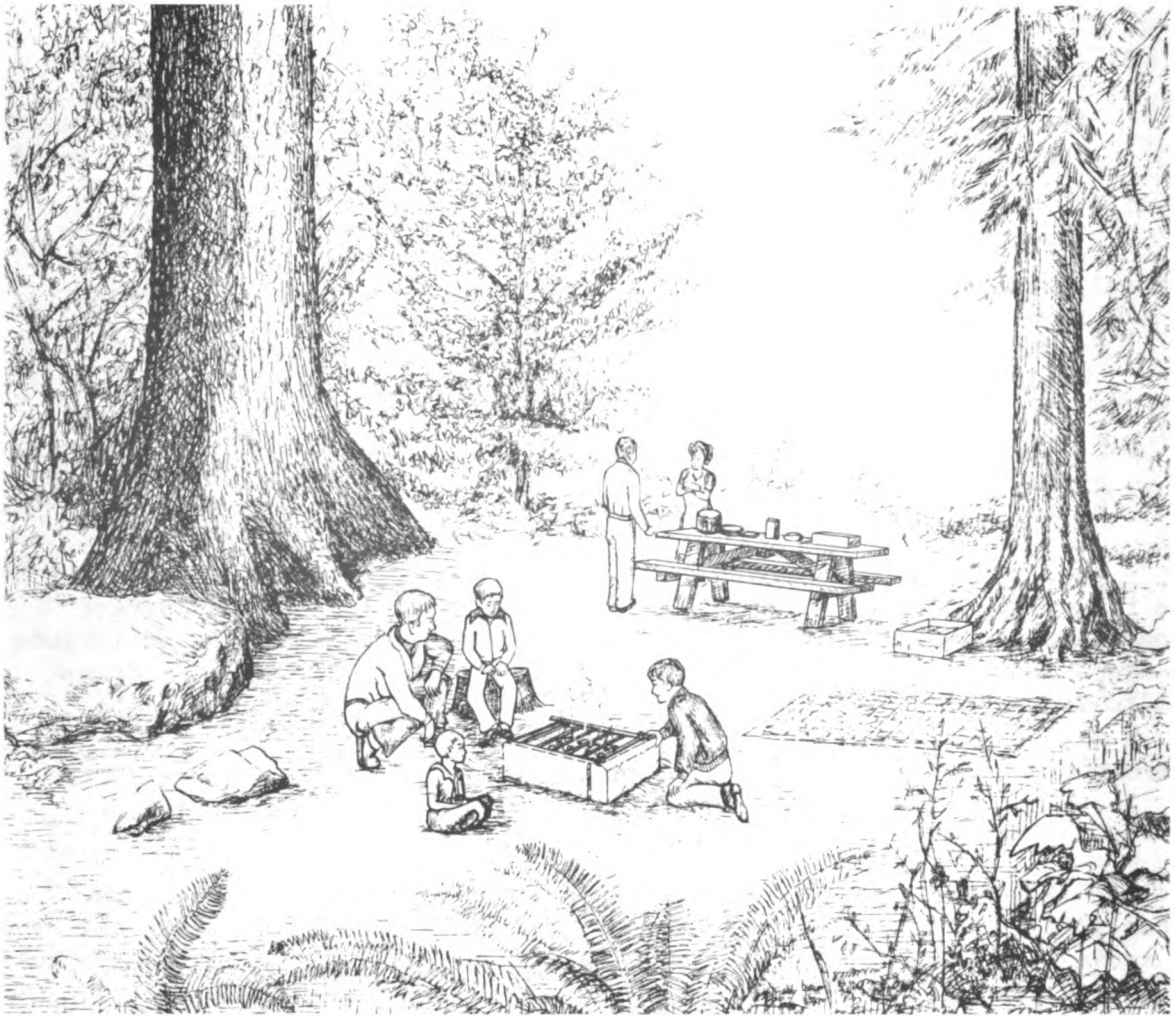
Current Situation

National Forests in the Region, with their mix of climates, landforms, and accessibility, provide diverse recreational opportunities. Nearly any type of recreational experience is available, from resort living to rugged back-country treks. Three National Forests--the Olympic, Siuslaw, and Siskiyou--border on or are near saltwater. The grandeur of the Cascades or the beauty of desert panoramas can be appreciated in other National Forests in the Region.

Because of their unique qualities, two areas within National Forests of the Pacific Northwest Region, totalling 700,000 acres, have been designated by Congress as national recreation areas: Oregon Dunes on the Pacific coast and Hells Canyon on the Snake River. Congress also has designated scenic-research areas, the Pacific Crest National Scenic Trail, and three national wild and scenic rivers.

Almost all National Forests contribute to a variety of recreation use patterns and developments, which include camping, hotels, lodges, resorts, motoring, hiking, hunting, fishing, and skiing. The capacity of all recreation sites developed to enhance various activities is 159,000 persons at one time (PAOT), excluding those sites established for downhill skiing.

¹This assumption was made for the purpose of constructing a hypothetical distribution of resource uses. Actual disposition of these areas will be made in Forest Land and Resource Management Plans.



The Pacific Northwest Region provides diverse recreational opportunities.

The Region currently maintains 1,009 campgrounds, with a capacity to accommodate 83,500 PAOT. These campgrounds are distributed throughout the entire Region, with the majority located on Forests close to population centers. However, many of these sites are quite old and need major reconstruction to meet today's standards.

There are 49 winter sports sites located on National Forest lands throughout the Region, with a total capacity of 94,800 PAOT; 25 of these sites provide alpine skiing opportunities. Any major expansion of downhill skiing facilities will probably be on National Forests.

In addition, the Region contains many caves that provide recreational opportunities, as well as unique habitat. Most of these caves are found on the Deschutes and Gifford Pinchot National Forests.

During 1979, the National Forest System of the Region hosted 31.6 million visitor days, which comprised 1 million visitor days in wilderness, 11.2 million visitor days for developed sites, 2 million visitor days for ski areas, and 17.4 million visitor days for dispersed recreation. Most of the dispersed recreation use occurred in existing undeveloped areas.

"Demand" in outdoor recreation primarily reflects changes in population levels, population characteristics, and per capita participation rates. Projections of nationwide demand for land-based recreation range from a 10-percent to a 44-percent increase above 1980 demand by the year 2000. Regional projections for the year 2000 predict about a 32-percent increase. Individual Forest projections range from a 24-percent to a 65-percent increase during the same time period. Individual land-based activities that are projected to undergo the most rapid relative growth between now and the year 2000 are developed site camping and dispersed camping. By the year 2030, recreation use on National Forest land is expected to exceed 55 million visitor days.

Wilderness. Closely related to the recreation resource is wilderness. The Forest Service is responsible for securing an enduring wilderness resource for the Nation by administering and protecting designated wilderness within the National Forest System. This is accomplished by ensuring that wildernesses remain unimpaired for future use and enjoyment; by preserving their wilderness character; and by providing information about their use and enjoyment. These areas are not only for the enjoyment of the public, they also provide high-quality watershed, habitat for wildlife, and opportunities for research and the preservation of unaltered ecosystems.

The Pacific Northwest Region presently administers 2,842,071 acres of designated wilderness, which includes area within the Hells Canyon National Recreation Area in Idaho. The rate of use differs widely among individual wilderness areas throughout the Region; some areas receive little use, while other more popular areas near population centers are beginning to exhibit signs of resource degradation.

The RARE II process recommended adding 802,502 acres to the wilderness system within the Region, which would not only include ecosystems that are not currently represented, but would also increase the acreage of legislated wilderness in those areas close to major metropolitan areas. The RARE II process also designated 627,000 acres for further planning, which includes area within the Hells Canyon National Recreation Area in Idaho.

On February 1, 1983, the Secretary of Agriculture made a decision to re-evaluate RARE II roadless areas as a result of the Ninth Circuit Court of Appeals decision in California versus Block. Pending any legislative change, the reevaluation will be done during the Forest land and resource management planning process and will include, in addition to further planning areas, roadless areas recommended for wilderness in RARE II and areas that were administratively designated for nonwilderness uses. Activities in nonwilderness roadless areas will continue under existing plans pending completion of the Forest Plans, so as to meet program commitments and to ensure that jobs dependent on those commitments will continue.

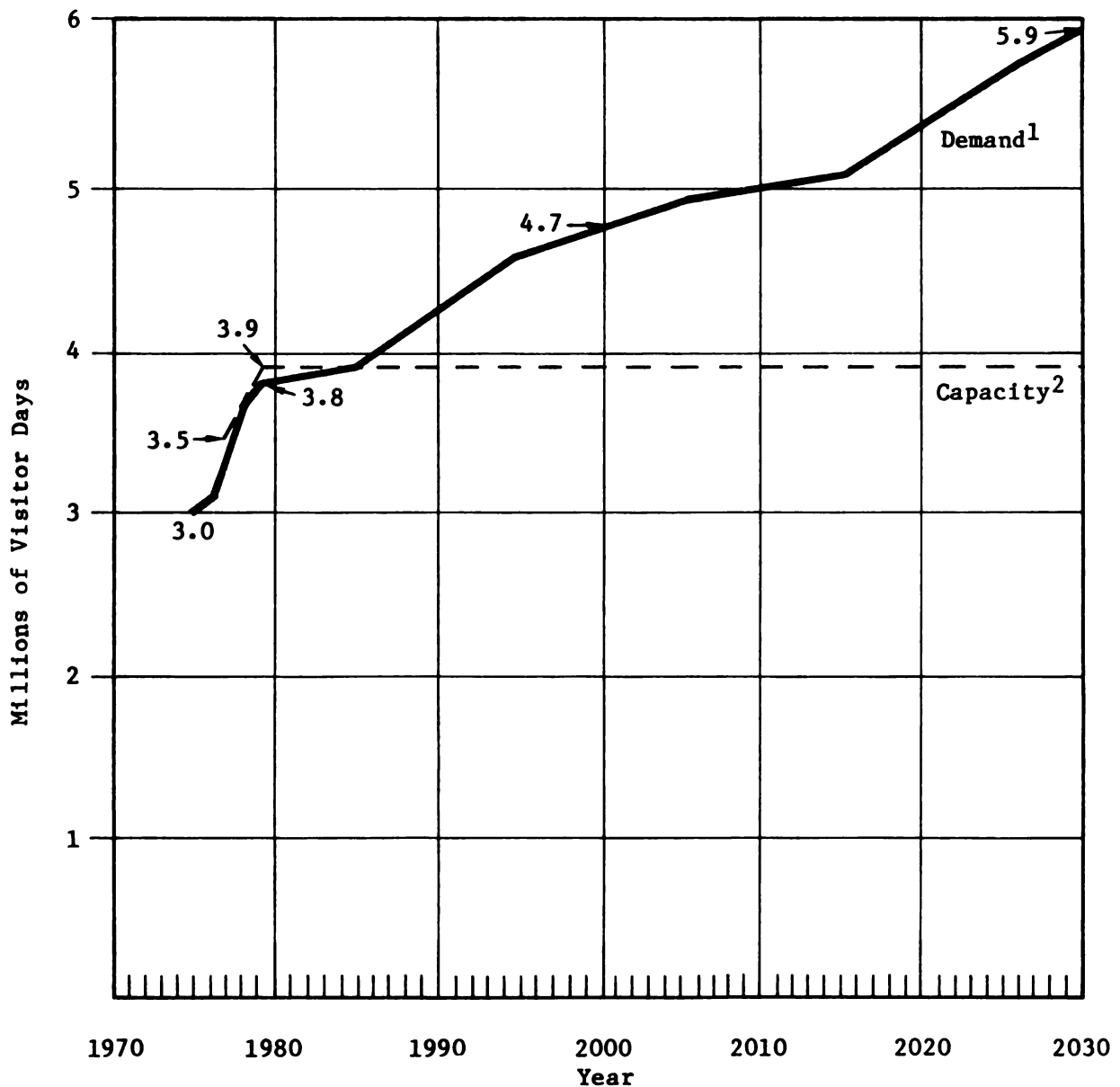
Wilderness capacity and estimated demand are shown in Figure 2-3. A carrying capacity was developed for the wilderness areas within each National Forest. The objective was to estimate the number of people that could visit the areas, while still maintaining the wilderness resource and experience. Factors considered were vegetative types, topography, length of season, and dispersal opportunities. As Figure 2-3 indicates, there is the need to accommodate a portion of the anticipated demand for primitive type recreation outside the wilderness system. Assumptions used in these estimates include the following:

1. Capacity from 1975 to 1979 includes existing wilderness plus wilderness study areas from RARE I.
2. Capacity from 1979 to 2030 includes existing wilderness and areas recommended for wilderness and those areas designated for further planning by the RARE II process.
3. Demand is projected at 11 percent of the total recreation demand for National Forest lands, which approximates the percentage of total current recreation use in designated wilderness and presently undeveloped areas. A portion of that demand is being met by presently undeveloped areas (2.6 million visitor days in 1977), which will continue to provide this type of use for several years.
4. A continuation of the present policy of no fees for wilderness use is assumed.

The Region does not currently have the capability to meet projected demand for wilderness use within the wilderness system, which will increase not only as a result of population increases, but also as use in presently undeveloped areas is displaced by other resource activities. Until about 1985, the Region will be able to meet the demand for this type of recreation within the wilderness system. The continued existence of undeveloped areas will accommodate the increased demand for some time beyond 1985. The Region has the capability to meet RPA targets for both developed areas and for wilderness and dispersed recreation, when the latter two are combined. The Region has the ability to meet RPA targets for wilderness acreage for the year 2030.

Visual Resource. The visual resource has a significant impact on the quality of the recreation experience. The Pacific Northwest Region has a national and international reputation for its outstanding mountain, valley, and coastline scenery. The most valuable scenery in the northwest is on those lands that are not only distinctive in character, but are highly visible from scenic travelways and resort and recreation areas. Because recreation use in this Region exceeds that in all other Regions except one, demand for scenic quality by northwesterners and visitors and concern about potential degradation of scenic quality are increasing and are expected to continue to increase during the planning period.

It is the policy of the U.S. Department of Agriculture to advocate the conservation of natural and manmade scenic resources, to improve the technical ability of agencies to identify and evaluate scenic resources, and to ensure that its agencies protect and enhance the visual quality of the landscape.



¹1974-79 demand includes wilderness use plus estimated use in undeveloped areas. 1990-2030 demand equals 11 percent of total projected outdoor recreation use.

²Capacity includes existing wilderness recommended areas and further planning areas X estimated carrying capacity.

Figure 2-3 Wilderness Capacity and Estimated Demand for Wilderness and Primitive Type Recreation Use

The Forest Service, in turn, has a policy to protect and improve the quality of natural beauty. The Pacific Northwest Region's mission includes applying these policies, along with other policies, goals, targets, and objectives, to all activities that result in visual alteration of the National Forest landscapes.

Visual quality is classified into categories related to scenic variety and how often it is viewed by the public. The "most valuable scenery" category is managed by two standards called retention and partial retention. (See the Glossary for definitions.) Although the majority of the most valuable coastal and valley scenery is under State or private control, much of the most valuable mountain scenery is located within National Forest lands. About 16.5 million acres of these lands are classified as commercial forest lands. Approximately 60 percent (9.5 million acres) of commercial forest lands are inventoried in retention or partial retention standards, thus creating a potential for serious conflicts between visual management of the scenery and timber management.

Timber harvest has occurred on an estimated 25 to 30 percent of the west side National Forest lands. Because clearcutting has been the predominant management method, the visual effect of this activity (and other management activities involving roads and utility lines) has altered about 70 to 80 percent of the overall visual quality in that area. On the east side Forests, an estimated 70 to 80 percent of the lands has been altered by timber harvest or by other management activities. However, east side timber management is much less noticeable because of its selective nature and because of the ability of the landscape to absorb visual alterations. Therefore, the net effect on the east side has been that about 20 to 25 percent of the overall visual quality has been altered.

An estimated 50 percent of the Region, west side and east side combined, has been noticeably altered, with visual impacts ranging from slight to heavy. Most of the alterations have occurred in commercial forest lands classified in a less valuable scenery category. However, the present trend is toward increased cutting in areas with the most valuable scenery, which, until now, have been spared. The areas designated for increased activities are distinctive in character and visible from scenic travelways and recreation areas, and, to some extent, the tourist industry in the northwest depends on the scenic image of this forested landscape. Although existing management direction is expected to continue to alter the overall visual condition of the area during the next 20 years, the use of mitigation measures prescribed by the Forest Service's visual resource management system will reduce the adverse effects of this alteration.

Issues and Limiting Factors

While the Pacific Northwest Region can provide a wide variety of high-quality recreation activities, conflicts can result between users over resource uses. For example, swimmers, boaters, fishermen, and campers may want to use the same lake; or backpackers and off-road vehicle users may want to use the same areas for unroaded or roaded recreation. The transportation system (including trails) is also subject to conflicting recreation demands. Foot, horse, and motorized travel may not be compatible on the same trail or road and thus may require the additional construction.

The use of the National Forests for commodity type outputs, particularly timber harvest, often conflicts with the objectives of recreation users, who are particularly concerned about the amount and location of areas available for unroaded or wilderness recreation. Managing National Forest lands for a variety of recreational uses, including wilderness, effectively reduces the acreage available for supplying timber. In addition, meeting visual quality objectives reduces timber outputs.

Factors that limit recreation resource management include the following:

1. Ineffectiveness in providing users with appropriate information about management or regulations concerning the use of a particular National Forest
2. Lack of public knowledge about where to go and about proper behavior in an outdoor setting
3. Impact of liability laws, reduced public access, and changing values on potential private recreation resource availability and development
4. Lack of market analyses for recreation resources for private lands
5. Costs of regulation and enforcement
6. Lack of, or negative, incentives to private forest landowners for increasing recreation development
7. Insufficient data about private forest land supply and use levels
8. Effect of energy costs on distribution of recreation activities
9. Cost of potable water and sanitation requirements on development of private resources
10. Need to rehabilitate or relocate existing campgrounds to meet existing demand

Opportunities

The following opportunities have been identified:

1. Increase user education about appropriate behavior concerning the use of recreation resources
2. Increase cooperation and joint efforts with other public agencies engaged in managing outdoor recreation programs
3. Where possible, physically separate conflicting recreation activities
4. Provide more recreation opportunities closer to urban populations

5. Provide opportunities for primitive-type recreation in unroaded areas to offset a projected shortfall in satisfying recreation demand in wilderness
6. Promote and better organize the use of volunteers in recreation management
7. Promote the use of public transportation to and from recreation complexes
8. Encourage private investment in providing recreation facilities on National Forests
9. Encourage States' participation in coordinated forest resource planning, including considerations of a recreation role for non-industrial private landowners
10. Utilize the visual management system for timber management production in sensitive areas

Cultural Resources

Current Situation

Although National Forest lands have a large number of sites that can provide information about the history of the Pacific Northwest, the exact nature and distribution of these resources has not yet been determined. Thus, present knowledge about the extent of the regional cultural resource base, including areas of cultural or religious significance to American Indians, is limited.

Three million acres (about 12 percent) of the total National Forest System lands have been inventoried. However, site evaluation and enhancement lag behind the inventory program. To date, 12 heritage properties are included on the National Register of Historic Places, and an additional 7 nominations are pending. Altogether, 826 cultural sites are afforded protection. Currently, 190 cultural properties are interpreted or otherwise enhanced to provide public knowledge and enjoyment.

Current cultural resource program direction places primary emphasis on inventorying and documenting compliance with laws and regulations. Secondary emphasis is placed on protection, enhancement, and other affirmative cultural resource management activities. To meet all mandated cultural resource responsibilities, funding levels would have to increase 150 to 200 percent over current levels.

The rate of identification and management of significant cultural resources has increased on both National Forest lands and private lands since 1974. The current annual workload can be measured in assigned output targets as follows: inventory of 520,000 acres per year; evaluation of 500 cultural and historical sites per year; protection of 500 cultural and historical sites per year; and enhancement of 19 properties per year. Private efforts, however, have focused primarily on rehabilitating and restoring historic structures. Private investment has increased dramatically since

1976, when tax incentives, grants-in-aid, and improved communication about the advantages of historic preservation stimulated private sector investment.

The number and type of conflicts involving cultural resources have remained fairly steady on National Forest land since 1974 as a result of improved early identification of potential conflicts. While the supply of cultural resources is finite, both costs and outputs have increased steadily. Demand for public and scholarly use is expected to increase as the resource base diminishes through use, management decisions, or vandalism and as research techniques, research questions, and adaptive or continued use priorities change.

Issues and Limiting Factors

There is a need to discover, manage, protect, and interpret cultural resources that are qualified or that may qualify for inclusion in the National Register of historic places. Cultural resource management is labor-intensive, and the evaluation, protection, maintenance, rehabilitation, and interpretation of such resources can be costly. Like other management areas, cultural resource management must compete with other management activities for funds. Emphasis on high commodity resources also may restrict options for managing identified cultural resources.

Although fires, insects, diseases, landslides, or floods generally are not a threat to cultural resources on a regionwide basis, localized damage does occur. Vandalism, however, remains a constant threat. At this time, unevaluated cultural resources are protected from direct project impacts through physical avoidance. The actual number of acres involved is relatively small (less than 1 percent of the total), and there is little impact on the output of other goods and services. However, the potential for resource conflict increases as the acreages managed to other resource management objectives increase, and the resultant impact on some cultural resources may be unavoidable.

Opportunities

Given current knowledge of the cultural resource base in the Pacific Northwest Region, programs can be designed that would designate archaeological and historical resources for appropriate scholarly use; to provide interpretive programs for public enjoyment; to encourage multiple-use management, including cultural resource management activities, through technical assistance to State Foresters and coordination with State Agencies; and to identify types of sites on National Forests that have income potential.

Wildlife and Fish

Current Situation

Regional habitat management efforts consider all vertebrate species as well as a number of economically or socially important invertebrate species. Special emphasis is given to maintaining and enhancing the habitat for sensitive, endangered, and threatened species and to maintaining or increasing

the productivity of economically important species and game (for example, anadromous fish, deer, and elk) for both consumptive and nonconsumptive uses.

Through treaties and other Federal actions, certain hunting, fishing, and other rights and privileges applicable to portions of some National Forests have been reserved for specific Indian tribes in the Region.

Management responsibilities for the Region's wildlife and fish resources are shared among Federal and State Fish and Wildlife agencies, as required by Public Law 93-452 (Sikes Act), which requires current comprehensive statewide fish and wildlife plans. The Forest Service fulfills its management responsibilities primarily through habitat management.

Wildlife. In the Region, private industrial forest lands are managed principally for timber production rather than wildlife, while private, nonindustrial lands are likely to have diverse objectives. Nevertheless, privately owned forests and rangelands play a major role in providing key wildlife habitats. From 60 to 80 percent of small-game hunting and 20 to 35 percent of big-game hunting occurs on private land. Lands managed by other Federal agencies (principally the Bureau of Land Management in the Department of the Interior) and the States contribute about 20 percent of small-game hunting and 20 to 30 percent of big-game hunting.²

The 748 vertebrate species known to occur on the Region's National Forests include both resident and migrant species of freshwater and estuarine fish (179 species), mammals (174 species), birds (335 species), and reptiles and amphibians (60 species). Little basic inventory information is available for most of these species.

Game species in the Region include deer, elk, bear, bighorn sheep, cougar, pronghorn, mountain goat, caribou, moose, grouse, rabbit and hare, quail, dove, squirrel, pigeon, turkey, chukar, and a variety of waterfowl. Economically important furbearers include beaver, raccoon, bobcat, and coyote. The States regulate the harvest of 168 species of game in Pacific Northwest Region Forests.

A comparison of annual wildlife forage production and the estimated forage needs of deer and elk on National Forests shows that deer and elk numbers and forage production are in reasonable balance when the Region is considered as a whole. (See Figure 2-4.) There are, however, recognized imbalances on some Forests on the east side.

Several groups of species have special management needs. These groups include species dependent on special habitat conditions, such as riparian areas; cavity-nesters; species requiring early, mature, or old-growth forest conditions for optimum habitat; and popular game species. Snag management is intended to provide habitat for 31 animal species.

²Draft RPA Assessment, Tables 4.13 and 4.15, pages 182 and 186.

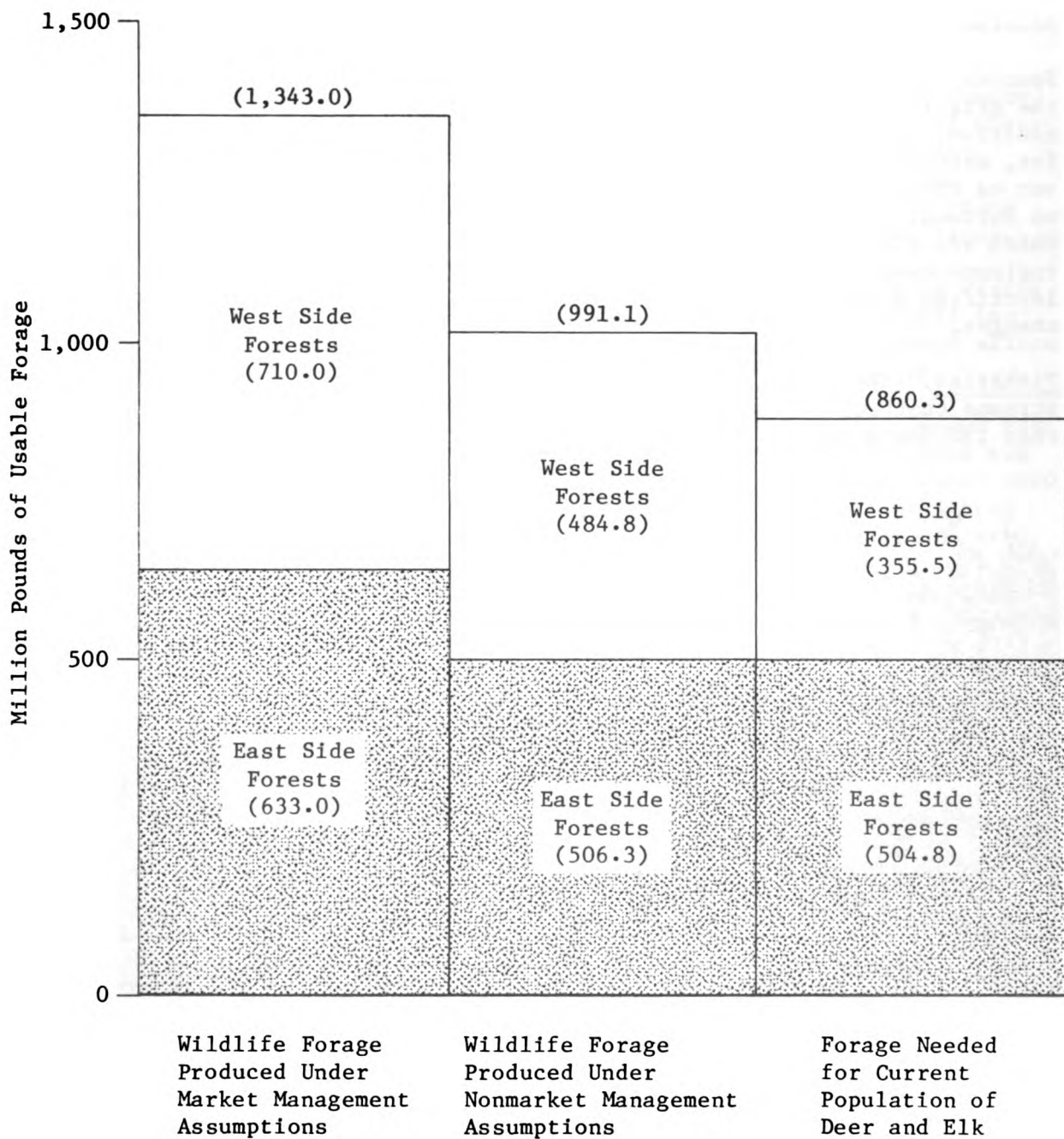


Figure 2-4 A Comparison of Annual Wildlife Forage Production and Estimated Needs of Deer and Elk on National Forests

Seven wildlife species registered on the Federal endangered species list are found on Pacific Northwest Region National Forests: the Columbian white-tailed deer, the gray wolf, the woodland caribou, the California brown pelican, the Aleutian Canada goose, the American peregrine falcon, and the Arctic peregrine falcon. McFarlane's Four O'clock is the only plant in the Region currently listed as endangered by the U.S. Fish and Wildlife Service.

Species in the Region that have been federally designated as threatened are the grizzly bear, the bald eagle, and the Oregon silverspot butterfly. In addition, the State of Oregon has classified the sea otter, wolverine, kit fox, western spotted frog, northern spotted owl, and the western snowy plover as threatened. Of these, all but the kit fox and the sea otter exist on National Forests. Additional species occurring on National Forests, which are classified as sensitive by the State of Washington, are the ferruginous hawk, bald eagle, and northern spotted owl. The Region also has identified a number of plants and animals that are sensitive to habitat changes.

Fisheries. The Pacific Northwest Region has approximately 15,000 miles of streams that support both resident and anadromous fish, as well as more than 150,000 acres of lake habitat and 65,000 acres of reservoir habitat



The Pacific Northwest Region provides habitat for many species of game fish.

that can support both warm- and cold-water fish. These aquatic habitats range from estuaries on the Siuslaw National Forest to alpine lakes along the Cascade Crest. Important resident game fish include rainbow, brook, brown, Dolly Varden, eastern, and cutthroat trout, as well as Kokanee and mountain white fish. All are highly valued as recreational fish. Anadromous fish, which have both sport and commercial value, are found on 15 of the 19 Forests in the Region. Virtually all watersheds in the western part of the Region support one or more species of anadromous fish.

Although National Forest lands provide more than 50 percent of the freshwater anadromous spawning and rearing habitat in the Region, most of the harvesting of these fish occurs downstream from the Forests or in the ocean. Critical conditions, such as access for migrating adults and smolts, quality of spawning habitat, adequate rearing habitat, and high-quality water, are primary management concerns on National Forest lands.

Demand for salmon products has been high for some time, with prices rising steadily, and at times dramatically, resulting in an almost fourfold increase between 1967 and 1976. Strong pressure to maintain or expand salmon stocks for commercial fishermen and others is expected to continue.

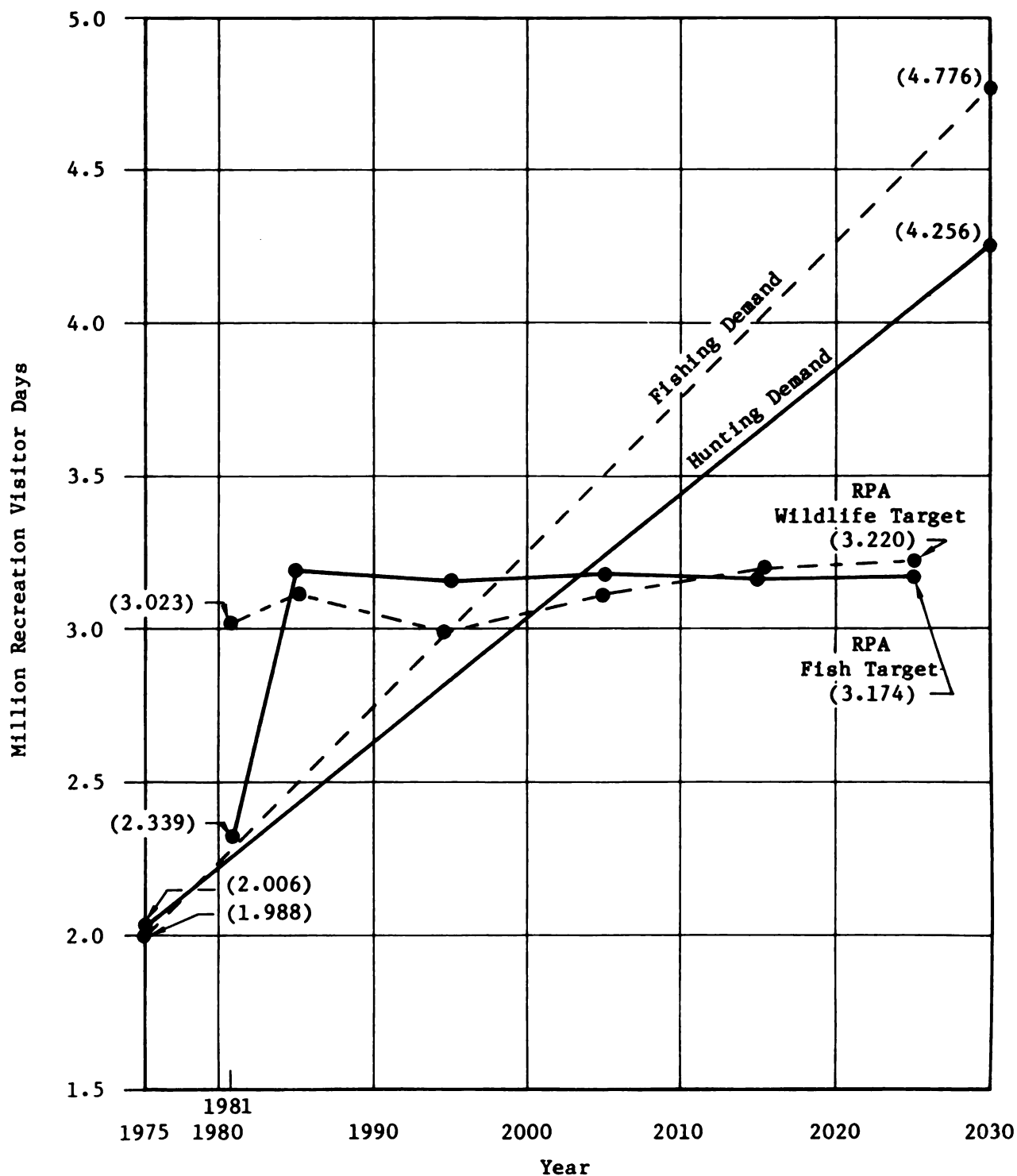
Based primarily on license sales and participation rates, total demand for all hunting and sport fishing in the Pacific Northwest (both resident and anadromous species) is expected to increase by about one-third between 1980 and 2000. The data in Figure 2-5, which shows RPA targets and projected demand for hunting and fishing on the National Forests, indicate the need to emphasize more strongly both fisheries and wildlife habitat to meet the demand for these resources, including provisions for Indian treaty rights and privileges beyond the year 2000. Nonconsumptive uses of fish and wildlife, such as photography and bird watching, are also increasing in demand.

Issues and Limiting Factors

Diversity. The National Forest Management Act of 1976 requires that the land management planning process provide for and maintain plant and animal diversity. Today, both the public and Forest Managers have expressed concerns about diversity, including the need for individual species and community diversity and the need for operational definitions and measurement methods.

Of particular concern to wildlife diversity is the management of riparian areas, old-growth timber, and standing and down dead trees.

Riparian Areas. Riparian habitat contributes more to the production of wildlife and fish than any other single type of habitat. It is also highly important to other competing uses, such as timber production, recreation activities, and livestock grazing. In some cases, these uses have adversely altered riparian areas for use by wildlife and fish.



Source: Annual Wildlife Report. USDA, Forest Service. 1980: RPA Targets.
 Round 14: Columbus-North Pacific Region Comprehensive Framework Study.
 November 1971.

Figure 2-5 RPA Output Targets and Projected Demand for Hunting and Fishing on National Forests in the Pacific Northwest Region

National Forest Old-Growth Timber. The practice of harvesting and replacing "old-growth" timber stands, that is, mature and over-mature stands containing high volumes of timber, with more commercially valuable timber can adversely affect some species of wildlife, such as the northern spotted owl, which prefer and may require, such habitat. Guidelines for the survival of these species must be considered in the land management planning process. Another aspect of the old-growth issue is the public's desire to maintain various amounts and distribution of old-growth stands.

Snag Management. Many wildlife species require standing or down dead trees for feeding or nesting. As the demand for wood chips and home heating fuel increases, the economic value of dead trees increases, and timber management practices are directed toward removing these dead trees to meet these demands and to improve tree planting conditions. Future use of snags as fuel to generate electricity may prove to be a major factor influencing their management. In addition, in some locations, standing snags are considered potential hazards to controlling wildfire and a danger to forest workers.

Considerable information about wildlife requirements for dead standing or down trees is available. A Regional policy specifies that dead trees, both standing and down, will be provided in sufficient numbers to maintain primary cavity excavators in excess of 40 percent of their potential population capacity on commercial forest lands. Most Forest Supervisors have issued snag management policies more specific to local forest conditions. The major management concern for wildlife is whether the recognized habitat for cavity-dependent species as prescribed in Regional policies can be supplied on each Forest, while, at the same time, resolving other resource conflicts.

Anadromous Fish. In the process of developing other natural resources during the past 50 years, anadromous fish habitat has been seriously depleted in Washington and Oregon. Recently, the decline of the anadromous fish population has been so extensive that it has become a major Regional issue. Commercial, recreational, and Indian fishery interests all are deeply involved in the issue.

National Forest lands encompass a large part (more than 50 percent) of the available habitat in the Pacific Northwest. Consequently, the Forest Service will play an important role in protecting satisfactory anadromous fish habitat and improving habitat that is unsatisfactory.

Threatened and Endangered Species. In protecting threatened and endangered plants and animals within the National Forests, the Forest Service needs to avoid or reduce conflicts with other National Forest uses and development.

Factors limiting wildlife and fish management include the following:

1. Funds and expertise are not sufficient to redeem both wildlife and fish management objectives and to coordinate with impacting activities.
2. It is difficult to control elk and deer distribution in terms of both location and time.



Many wildlife species require standing down dead trees for feeding or nesting.

3. There is a lack of fish and wildlife habitat inventory information, including information about nongame and threatened and endangered species.
4. Snag management is costly because of timber left, protection from fire, and safety.
5. There is a lack of quantifiable fish and wildlife management objectives.

The objectives of fish and wildlife management conflict with other resource management activities when those activities limit food, water, or cover to unacceptable levels. Poorly managed livestock grazing can result in damage to riparian habitats or competition between livestock and elk for the most desirable forage. Timber management and road construction activities also may degrade riparian habitats. Intensive land-use activities affect anadromous fish when they degrade the stream habitat by adversely changing the physical channel conditions or the quality of the water in the channels. Land clearing resulting from fire, logging, and grazing can expose large sections of streams, which increases the water temperature and breaks down the streambanks. Although floods and unplanned fires can be disastrous to fish and some wildlife, neither is expected to limit wildlife management options.

Opportunities

The following opportunities have been identified:

1. To define more clearly the resource trade-offs necessary to bring about improved riparian habitat conditions, (such as improved grazing systems, timber harvest reduction, and fencing)
2. To maintain a habitat inventory and a fish and wildlife habitat relationship data base
3. To research new techniques of improving habitat and preventing habitat deterioration
4. To prevent habitat deterioration by using known effective techniques

Range

Current Situation

The Pacific Northwest Region has provided forage for domestic livestock since the late 1800's--long before the National Forests were reserved from the public domain. This forage resource has enabled many livestock owners to maintain balanced yearlong ranching operations.

The rangelands historically also have provided forage and habitat for many important wildlife species. As the demand for greater populations for some species increases, the National Forest System ranges will remain an integral part of the wildlife production in the Region.

The Region has a total of 7,860,000 acres in range allotments, with 6,300,000 in Oregon and 1,560,000 in Washington. More than 80 percent of the National Forest grazing lands are forested. Most of these ranges are in satisfactory condition, although some areas still are used excessively. There is a need to plan and implement specific grazing management systems to alleviate overuse and to balance livestock and wildlife needs with forage supply and timber regeneration needs.

Tables 2-2 and 2-3 provide a summary of acres of forest and rangeland in the Region under other Federal and non-Federal ownerships and show the percent of land grazed under each ownership.

The Pacific Northwest National Forest rangelands provide 1.5 billion pounds of forage for livestock and wildlife on established range allotments. Nearly 157,000 cattle and 100,000 sheep use approximately 750,000 animal unit months of forage each year on 870 National Forest range allotments. There is also the potential for additional forage use by livestock outside of existing allotments, particularly if lower slope timberlands west of the Cascades are used as transitory range.

Table 2-2

Summary of Forest and Rangeland Under Other Ownership
(Thousand Acres)

State	Forest land		Rangeland	
	Other Federal	Nonfederal	Other Federal	Nonfederal
Oregon	4,938.0	11,112.1	11,312.7	9,186.9
Washington	1,050.3	24,818.8	1,019.7	6,227.4
TOTAL	5,988.3	35,930.9	12,332.4	15,414.3

Table 2-3

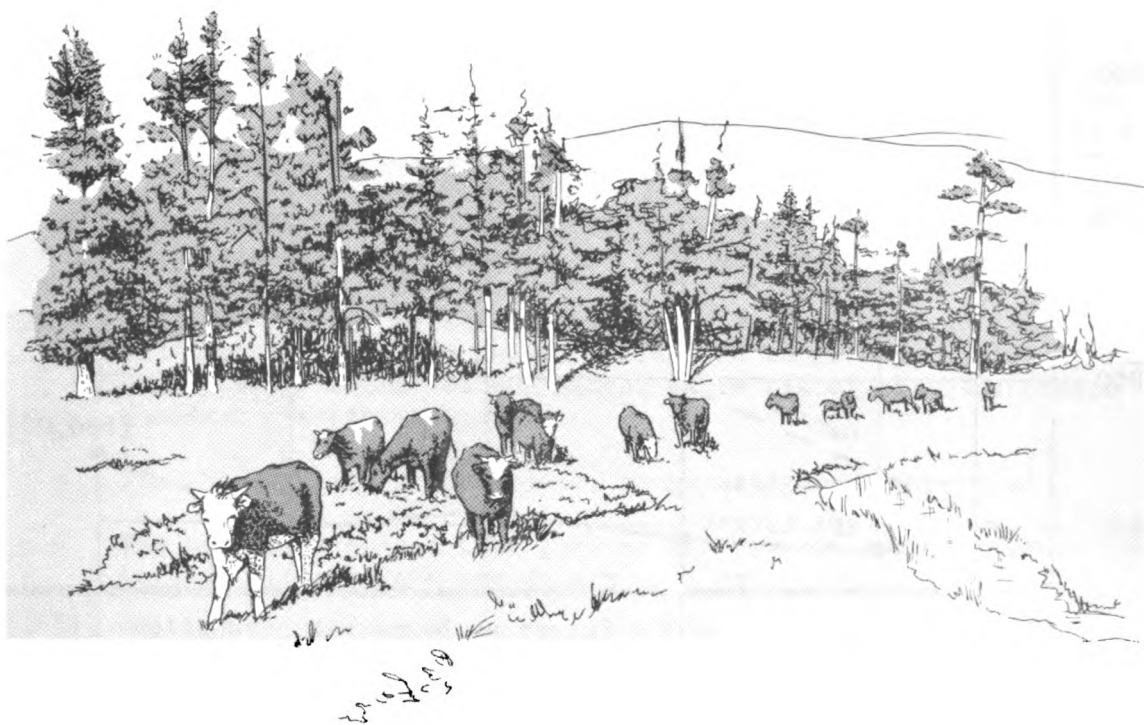
Percent of Land Grazed Under Each Ownership

State	Other Federal	Non-Federal
Oregon	79	70
Washington	38	58

Sources for Tables 2-2 and 2-3: "An Assessment of the Forest and Rangeland Situation in the United States," USDA, Forest Service, 1980; and "The Nation's Range Resources, A Forest-Range Environmental Study," USDA, Forest Service, Forest Resource Report No. 19, December 1972.

Figure 2-6 displays the potential (market) output level and the low-level (nonmarket) output. The projected demand is displayed between these two levels. The 1981 RPA target is below the low-level output and demand, while the RPA target for 2030 is well below the "market" potential. Much of this increase, however, is based on anticipated use by sheep of transitory range created by timber harvest on National Forests.

The demand for range grazing is derived from the demand for livestock products, particularly meat and wool. While nationwide demand for range grazing is projected to increase to about 41 percent above 1976 levels by the year 2000, the projected demand in the Pacific Northwest is expected to increase by about 50 percent. Increasing costs are reducing feedlot opportunities and creating additional demand for natural range forage. In many areas of the West, including the Pacific Northwest, Federal range may be a critical component in meeting this demand.



Forage for domestic livestock has been furnished by the Forests of the Pacific Northwest Region since the early 1900's.

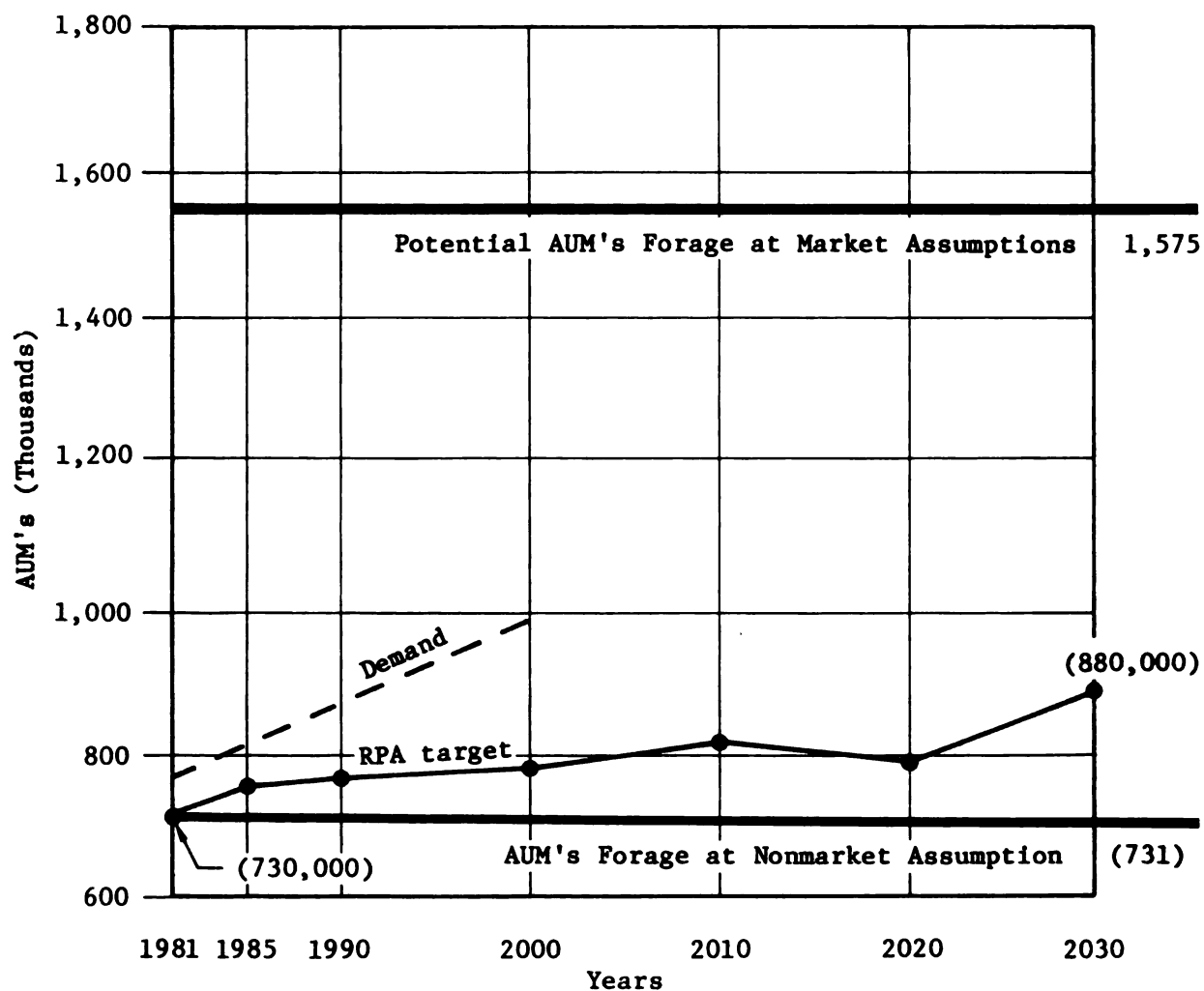


Figure 2-6 Range Resource Targets, Forage Production Potential, and Demand Expressed in Animal Unit Months (AUM's)

Issues and Limiting Factors

Timber harvest patterns affect changes in wildlife forage and cover as well as distribution and travel relationships for both wildlife and livestock. Increasing numbers of elk in northeastern Oregon and southeastern Washington are competing with permitted livestock for forage on some specific areas during certain times of the year. Consequently, local areas, where competition for forage occurs, are being excessively used. Some riparian areas east of the Cascade Range also have been used excessively by livestock. The concentration of livestock use in these areas has reduced water quality, damaged streamside vegetation, degraded fish habitat, and reduced overall site productivity. Livestock must be managed to ensure perpetuation of threatened and endangered plant and animal species.

Limiting factors include the following:

1. The widespread and mistaken belief that grazing, even when properly managed, is not compatible with wildlife, riparian areas, and timber regeneration
2. The increasing and conflicting demands by the public for both market and nonmarket commodities or values
3. The funding necessary to implement and monitor high-quality resource management programs that will bring RPA targets and land capability closer together
4. The failure to recognize the multiple-use benefits associated with range resource management other than grazing fee receipts
5. The inability of market conditions to sustain a sheep industry that can capitalize on the Region's timbered range opportunities, especially west of the Cascade Range, where timber harvests create abundant transitory range
6. The shortage of on-the-ground, range management expertise
7. The potential damage that grazing can have on young trees in timber harvest areas before stands are well established
8. Competition for forage by growing elk populations

Opportunities

One opportunity that has been identified is the use of coordinated forest resource planning to involve those concerned and to obtain their commitment to planning and managing State, Federal, and private lands. Another is the opportunity to develop sheep-grazing on west side Forests, including using additional forage available through intensive timber management.

Timber

Current Situation

The National Forests of the Pacific Northwest Region, along with forest lands under other ownerships, are among the most productive in the world. Approximately 90 percent of the National Forest lands in the Region are forested, of which about 76 percent (18,586,400 acres) has a productivity level equaling or exceeding 20 cubic feet per acre per year. Approximately 85 percent of this acreage is currently available for regulated timber management and represents approximately 65 percent of the total National Forest land in the Pacific Northwest Region. (See Table 2-4.)

Table 2-4

Timberland Classification Summary, Pacific Northwest Region

Land Classification	Thousands of Acres
Total National Forest Land	24,455.1
Nonforest and Water	2,450.6
Forested Land	22,004.5
Unproductive (Productivity less than 20 cubic feet per acre per year)	3,418.1
Productive (Productivity more than 20 cubic feet per acre per year)	18,586.4
Reserved and Deferred	2,065.9
Commercial Forest Land	16,520.5
Unregulated	580.2
Regulated	15,940.3
Standard	10,609.4
Special	2,865.9
Marginal	2,465.0

Source: TMIS computer files, USDA, Forest Service, Pacific Northwest Region, existing classification.

The extensive stands of softwood timber in the National Forests of the Pacific Northwest Region are of national significance--representing 38 percent of the entire softwood volume of the National Forest System (See Table 2-5.)

Table 2-5

**Standing Inventory--Softwood Sawtimber on Commercial Forest Lands in
National Forests, Pacific Northwest Region**

Diameter Class (Inches)	Douglas-Fir Subregion (Million ¹ bd.ft.)	Percent	Ponderosa Pine Subregion (Million bd.ft.)	Percent	All Softwood Timber Total	Percent
9.0-16.9	59,511	22	48,654	42	108,165	28
17.0-28.0	75,742	28	45,179	39	120,921	31
29+	135,255	50	22,011	19	157,266	41
TOTAL	270,508	100	115,844	100	386,352	100

¹In an effort to accurately portray the Region, the most recent available data from different ownerships (State, Federal, and private) were collected and used in the units of measure available. Board foot and cubic measures using different rules of application will be found throughout the text.

Source: Developed from tables in Forest Statistics of the United States, 1977, USDA, Forest Service. Volumes based on international 1/4" scale.

The Douglas-fir subregion includes lands west of the summit of the Cascades, and the ponderosa pine subregion includes lands to the east. The two subregions differ markedly in their timber productivity; the Douglas-fir subregion is the more productive of the two. (See Table 2-6.) For example, 43 percent of the Douglas-fir subregion is in the 120-plus cubic feet per

Table 2-6

**Timber Productivity on Commercial Forest Lands in National
Forests, Pacific Northwest Region
(Cubic Feet per Acre per Year)**

	Productivity Class				Total
	120+	85-119	50-84	20-49	
Douglas-Fir Subregion					
Thousand Acres	2,825	1,552	1,991	290	6,658
Percent	43	23	30	4	100
Ponderosa Pine Subregion					
Thousand Acres	655	2,148	5,399	1,660	9,862
Percent	7	22	55	16	100
TOTAL REGION					
Thousand Acres	3,480	3,700	7,390	1,950	16,520
Percent	21	22	45	12	100

Source: Based on TMIS 4-80 Forest Statistics of the United States, 1977, USDA, Forest Service.

acre per year productivity class, compared to only 7 percent in the ponderosa pine subregion. Although the ponderosa pine subregion is less productive, local industries and communities are nevertheless highly dependent on this valuable timber-producing land.

Figure 2-7 shows the percentage of commercial forest land owned by various public and private owners in Oregon and Washington. Although industrial and nonindustrial private landholdings are extensive, their management objectives differ dramatically. Generally, industrial landholdings are managed primarily for timber production. Few nonindustrial private forest lands are managed for continuous timber production. Most are held for a variety of objectives, and timber may be harvested occasionally or not at all. Recent studies indicate that nonindustrial forest lands probably produce less than one-third of their potential timber production.

The commercial forest lands in both industrial and nonindustrial private ownerships are generally of higher quality than National Forest lands. Roughly 55 percent of industrial ownerships contain timberland capable of producing more than 120 cubic feet per acre per year, while 44 percent of farm and miscellaneous private holdings contain forest land of this quality. (Table 2-7 displays the softwood volume of these lands.) A significant number of acres of forest land is converted to nonforest uses each year.

Table 2-7

Standing Inventory--Softwood Sawtimber on Commercial Forest
Land in Other Public and Private Ownerships, Oregon and Washington
(Local Scale)

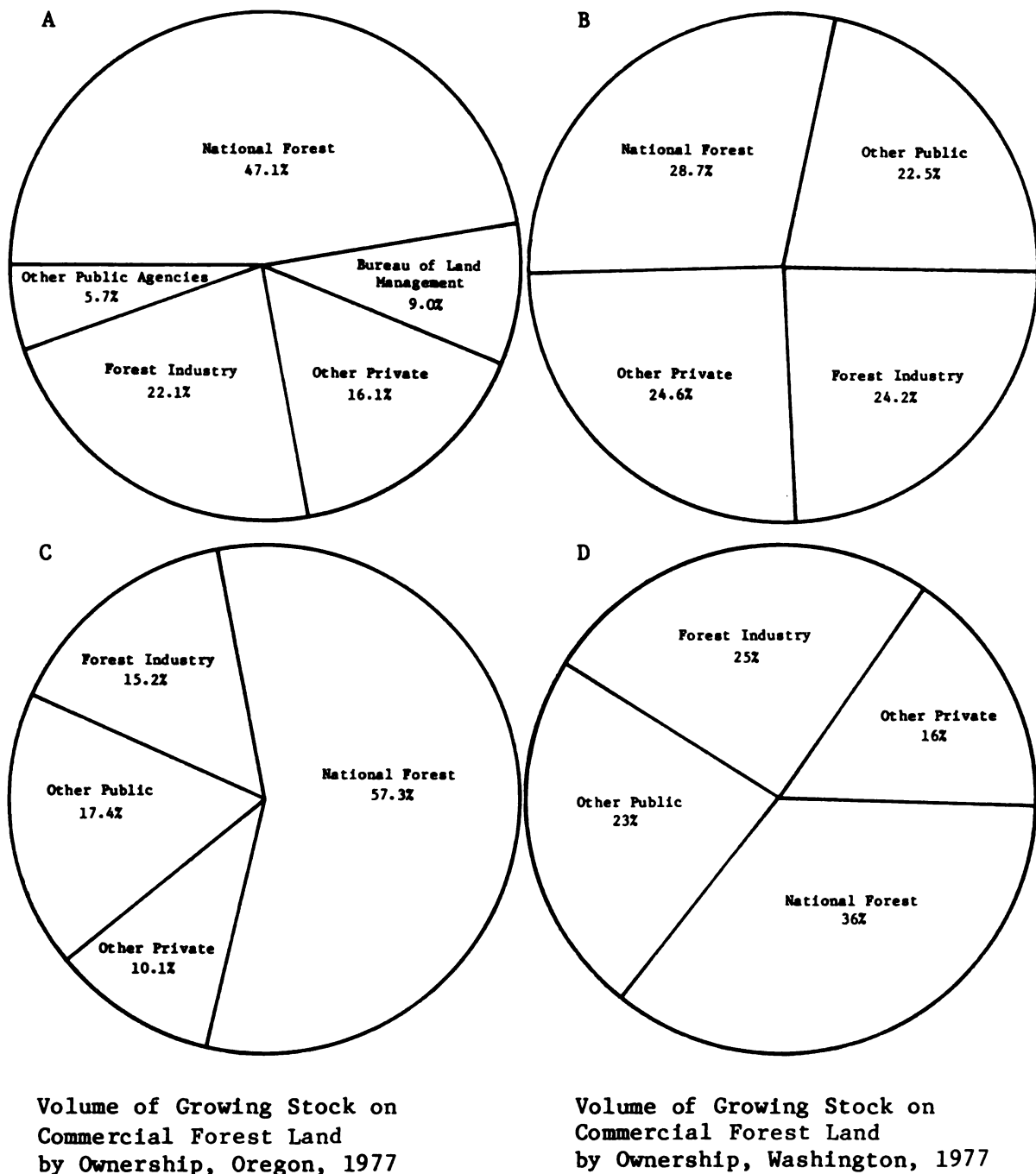
	Diameter Class (Inches)			Total
	9.0-16.9	17.0-28.0	29+	
Douglas-Fir Subregion				
Million Board Feet ¹	43,296	109,921	120,229	273,446
Percent	39	40	21	100
Ponderosa Pine Subregion				
Million Board Feet	16,229	32,415	16,944	65,588
Percent	25	49	26	100
TOTAL	59,525	142,336	137,173	339,034
TOTAL PERCENT	18	42	40	100

¹In an effort to accurately portray the Region, the most recent available data from different ownerships (State, Federal, and private) were collected and used in the units of measure available. Board foot and cubic measures using different rules of application will be found throughout the text.

Source: Developed from tables in Forest Statistics of the United States, 1977, USDA, Forest Service.

Ownership of Oregon's Commercial Forest Land
Total: 24,169,725 Acres, 1977

Ownership of Washington's Commercial Forest Land
Total: 17,911,134 Acres, 1977



Figures A and C based upon draft Oregon Forest Productivity Study Report, August 3, 1979. Figures B and D based upon draft Washington Forest Productivity Study Report, July 2, 1979.

Figure 2-7 Commercial Forest Land by Ownership

As Table 2-8 indicates, both sales and harvest on National Forest lands generally have increased in recent years (1975-1979). The table also indicates that the volume of wood cut has been less than the volume sold for each of the past 5 years. As of September 30, 1979, approximately 13.3 billion board feet of uncut volume, or approximately 2.9 times the average annual sales, were under contract. The trend in harvest on other owner-ships has been a general leveling. (See Table 2-9.)

Like National Forest harvesting activities, the reforestation programs show a similar general increase overall. (See Table 2-10.) However, available funding, weather, contracting, and site readiness cause annual variations.

Estimating the Regional and local level of demand for stumpage requires linking potential national demand levels with regional and local supply possibilities by seeking the points where national market prices are equated with local production costs (including transfer costs to markets). This method was used in the 1980 RPA Assessment of the Forest and rangeland situation in the United States. Based upon this method, the quantity demanded at equilibrium prices in the Pacific Northwest in 2000 will be only slightly greater (about 1 percent) than the quantity supplied in 1976. To achieve this equilibrium, stumpage prices would have to rise dramatically by the year 2000--two to three times above 1976 price levels.

Table 2-8

Cut and Sold Statistics for the National Forests, Pacific Northwest Region
(Million Board Feet)

	1975	1976	1977	1978	1979
Oregon					
Sold	3,423	3,485	3,412	3,498	3,556
Cut	2,740	2,966	3,109	3,184	3,258
Washington					
Sold	1,440	1,357	1,353	1,490	1,590
Cut	1,252	984	1,234	1,157	1,271
Region					
Sold	4,863	4,842	4,765	4,988	5,146
Cut	3,992	3,950	4,343	4,341	4,529

Table 2-9

**Harvest Statistics for Other Ownerships, Oregon and Washington
(Thousand Board Feet Scribner, Local Scale)**

	1975	1976	1977	1978	1979
Oregon¹					
Public	928	1,417	1,374	1,215	1,290
Private	3,781	3,561	3,590	3,549	3,209
TOTAL	4,709	4,978	4,964	4,764	4,499
Washington					
Public	1,025	1,342	1,352	1,485	1,649
Private	4,062	4,414	4,067	4,026	4,038
TOTAL	5,087	5,756	5,419	5,511	5,687

¹Based on updated data from the Oregon State Department of Forestry.

Table 2-10

**Thinning and Planting on National Forest Lands, Pacific Northwest Region
(Acres)**

	1975	1976	1977	1978	1979
Funds	Planting				
Knutsen-Vandenburg	73,489	72,599	62,658	85,175	76,983
Protection and Maintenance	19,760	23,558	21,060	32,901	32,021
TOTAL	93,249	96,157	83,718	118,076	109,004
	Thinning				
Knutsen-Vandenburg	29,881	30,934	23,276	22,094	26,642
Protection and Maintenance	42,507	40,030	25,454	40,949	35,687
TOTAL	72,388	70,964	48,730	63,043	62,329

Figure 2-8 displays an estimate of timber supply for the Region in 1980 and 2030. The total supply of 17.1 billion board feet is slightly higher than the 1980 demand of 16.6 billion board feet. This figure also shows the contribution of individual ownerships for 1980 and 2030. By 2030, supply is expected to fall below the demand level, with a projected supply of 15.3 billion board feet compared to a projected demand of 16 billion board feet.

Figure 2-9 displays biological potential, current potential yields, projected RPA targets, and minimum capability for National Forest timber. Based on projections of current timber management plans, the National Forests are capable of meeting 1982 RPA targets of 5.21 billion board feet, and by 2030, the Regional potential would slightly exceed the RPA projected target of 5.64 billion board feet.

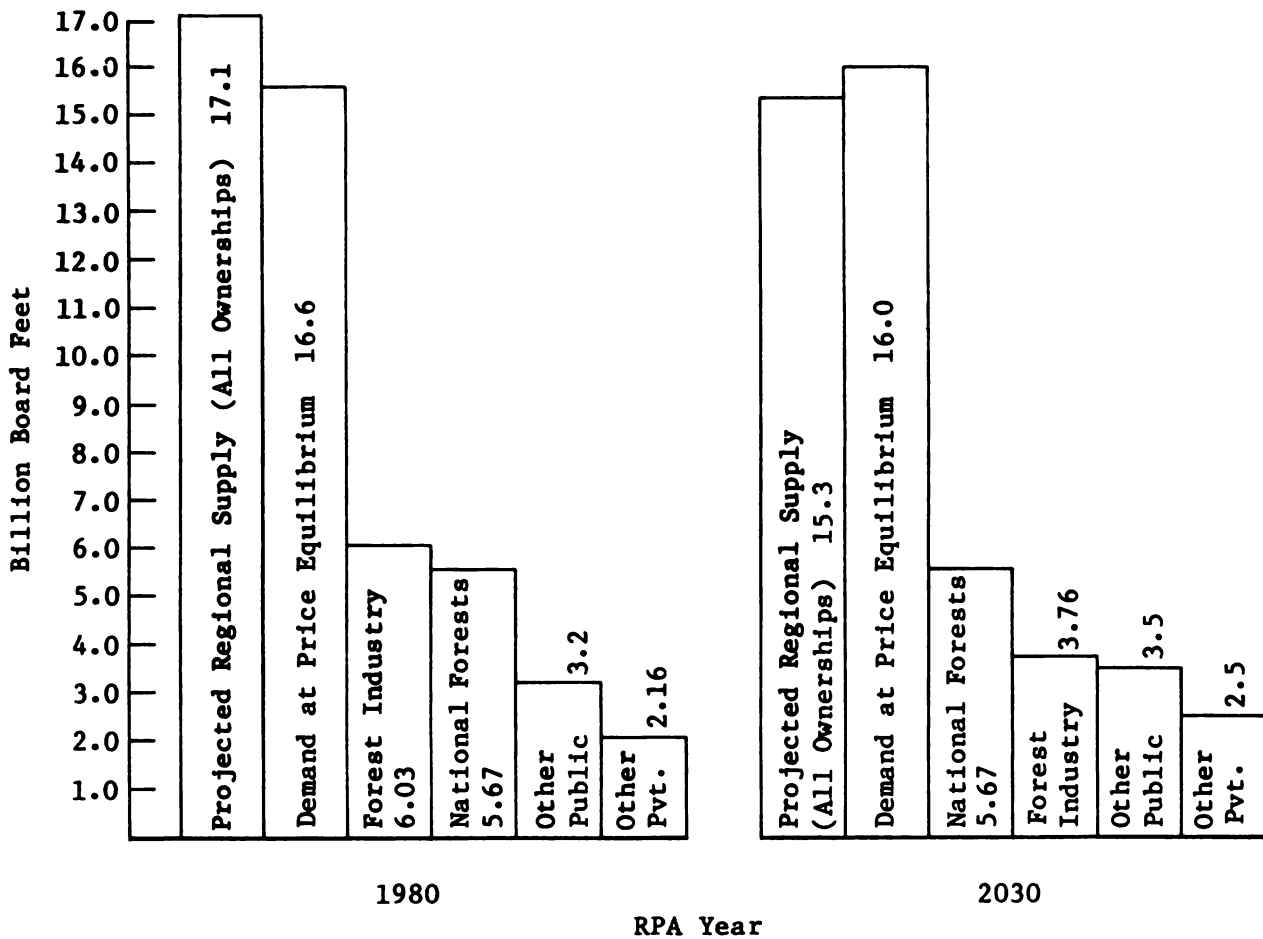
Potential hazards to the timber of the forests in the Pacific Northwest include wildfire, floods, severe wind or ice storms, insects and disease, landslides, and avalanches. Wildfire and insects and disease represent the most significant losses.

The average area burned annually by wildfire from 1970 to 1979 was 25,332 acres on National Forests and 19,015 acres on State protected lands. Factors that tend to increase the risk of wildfire include increasing accumulations of highly flammable forest debris, unusually severe and prolonged dry lightning storms, and increasing public use of the National Forest lands. Methods that tend to reduce the risk of wildfire include prescribed burning of debris and using forest residues to produce forest products (for example, pulp and fiber products, fence posts, and shingles and shakes) for fuelwood and for energy generation.

Insects and disease are estimated to cause losses of about 335 million cubic feet each year on the National Forests. A comparison of losses by State and ownership are shown in Table 2-11. When compared to total growing stock, these losses may appear somewhat minor. However, when compared to the average annual harvest of approximately 1 billion cubic feet for the last 5 years from the National Forests of the Region, this loss becomes more significant. This is coupled with the fact that disease losses are distributed generally throughout the Region, although insect losses occur primarily on the east side of the Cascades. A defoliator or bark beetle outbreak can have severe adverse effects on an individual forest or area. While some of the damaged timber can be salvaged to produce lumber or other forest products, a large proportion cannot. However, losses can be reduced through preventive measures such as those discussed under the Opportunities section.

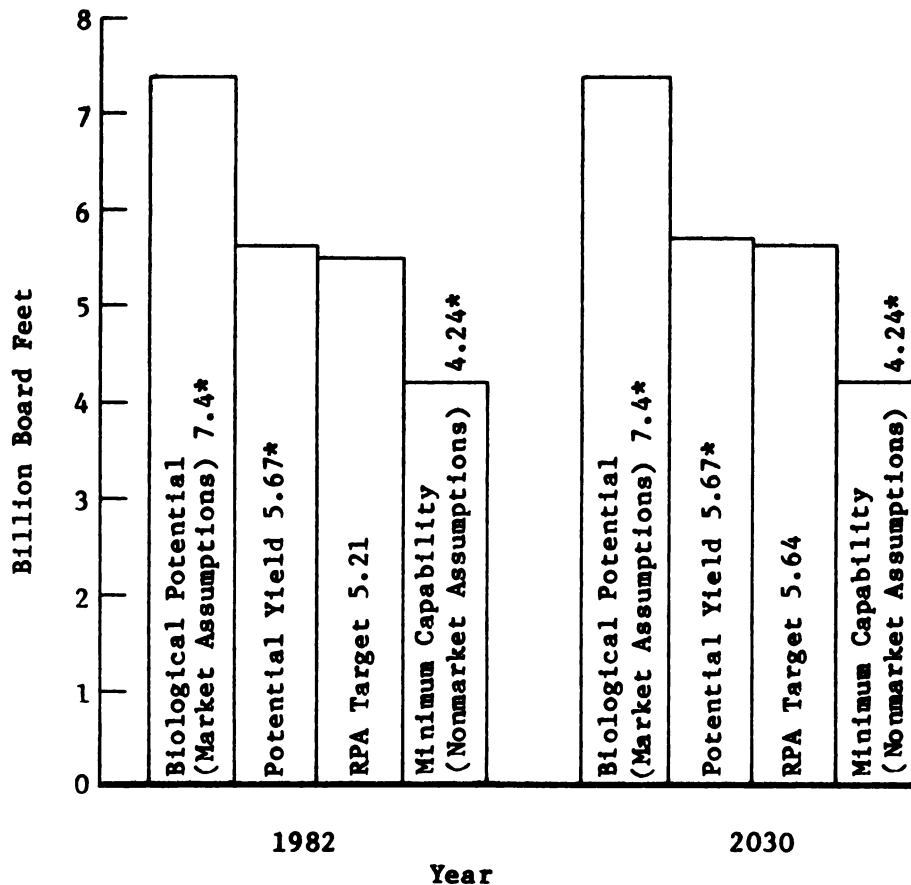
The primary issues concerning timber management in the Pacific Northwest Region include the following:

1. Increasing demands for National Forest timber in relation to predicted downward supply trends on other ownerships in both the short term and long term.
2. Conflicts exist between timber, range, and wildlife habitat management objectives.



Source: Gedney, Oswald, and Fight. "Two Projections of Timber Supply in the Pacific Coast States." PNW-80. 1975.

Figure 2-8 Projection of Regional Timber Supply and Demand for All Ownerships



*Includes 300 million board feet of nonchargeable volume for comparability to RPA volume.

Figure 2-9 Timber Capability for National Forests in the Pacific Northwest Region

Table 2-11

Annual Growing Stock Losses from Insects and Diseases
(Million Cubic Feet)

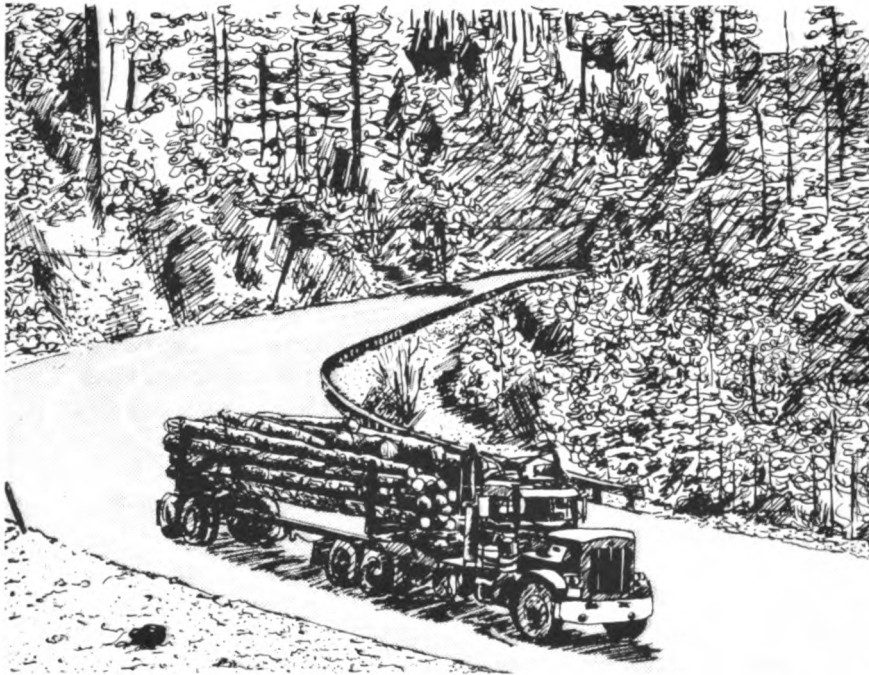
Land Ownership/ Management	Total Growing Stock	Annual Loss in Oregon	Annual Loss in Washington	Percent
National Forest	67,737	224.1	110.3	0.49
Other Federal	25,869	61.9	41.1	0.40
State and Private	38,923	147.5	142.4	0.75
TOTAL	132,529	433.5	293.8	0.55

3. Many people, including some employees, believe that chemicals should not be used for vegetation, insect, and disease management to promote the growth of timber, particularly if they have to be applied aerially. The Forest Service needs to improve its dissemination of factual information on chemicals and continue to develop vegetation and pest management methods that are responsive to increasing constraints on the use of manmade chemicals.
4. The Forest Service needs to meet current and future responsibilities to protect and improve soil productivity.
5. Effects from the level and types of timber harvest on other resources or uses such as outdoor recreation, municipal water supply, and threatened and endangered species and anadromous fish habitats.
6. Regional standards are needed to determine suitability and capability for growth.
7. The Forest Service needs to evaluate whether the National Forest commercial forest land base should be reduced through the exchange process.

Related to the timber supply issue and the ability to meet short-term targets (5 to 8 years) is the fact that future program targets will be dependent upon the Forest Service's ability to access, prepare, sell, and administer an increasing amount of projected sale programs in many of those areas made available for nonwilderness uses by the RARE II process. Since the initiation of roadless area reviews under the RARE I process, the Forest Service has been harvesting the full allowable harvest level from presently developed areas.

This required concentration of harvest on only a portion of the commercial land base has caused several problems, including higher mitigation costs and greater adverse resource impacts than would have been experienced with normal dispersion of sales in time and space. In addition, some stands have received less than the full silvicultural treatment needed and warranted because of their proximity to other sale openings, which frequently

made it necessary to provide less than ideal silvicultural treatments to ensure planned cover-forage ratios were maintained or to meet hydrologic or sedimentation rate limitations for the watersheds. Finally, opportunities to salvage insect and disease losses in the undeveloped areas have been lost; subsequently the dead and dying timber creates the potential for wildfires.



The Forest lands of the Pacific Northwest Region produce a significant share of the Nation's timber output.

The outputs from the National Forests are projected under the assumption of intensive timber management. The outputs from the National Forests are projected under the assumption of intensive management. The realization of this assumption has been lessened as the recently depressed economy continues a chain of events that has seriously delayed the planned application of silvicultural practices to many acres of National Forest land. Since mid-1974, the volume of timber under contract (sold but not harvested) has steadily increased from about 10 billion board feet, about twice the volume sold each year, to about 14 billion board feet by spring 1981. During this period, demand, while not high, remained steady. Projections of continuing inflation and a continuing market stimulated record bids, especially for Douglas-fir. The ensuing collapse of the housing market left many purchasers with timber sales which became economically unfeasible. By June 1983, the volume of timber under contract swelled to nearly 19 billion board feet.

The inoperability of these sales jeopardized the well-being of many companies and their employees. Also, because of their location, certain sales blocked access to other timber planned for sale. The inability to carry out regeneration of areas under contract and areas blocked by them means

that the planned intensive management will not be performed and the capability of National Forests to achieve projected timber production levels is subsequently reduced. The Forest Service, industry, and Congress are developing ways to alleviate this problem. Contract extensions are being granted, but while they assist in the stability of companies caught with high price sales, extensions do not provide a quick answer to attainment of the planned level of Forest management.

Another issue is to determine which investments in intensive timber management practices are appropriate over the planning period. Key points that must be considered are that intensive practices must be used to sustain levels currently projected and that intensive timber management requires large front-end investments to achieve the growth needed for later gains. Land suitability and the cost effectiveness of the intensive practices proposed must also be considered. Assurance is needed that investments are made on the best economic sites available. Budget preparation must consider front-end investments needed to meet future RPA needs and must also include supporting activities.

All of the projections assume that the land available for wood production remains stable and that any adjustments in commercial forest land use would be minor and compensating. Ability to meet RPA targets in the current program or in future program updates depends upon the amount of land available, the management prescriptions applied to that land, and the level of investment in Forest management. Even if the available commercial forest land base remains relatively stable, increasing restrictions from laws, regulations, programs, and other resources will limit the ability of the Forest to meet the RPA timber targets.

Opportunities

The following opportunities for resource use and development have been identified:

1. To increase timber outputs from the regulated commercial forest land base by improving scheduling, timing, and distribution of harvest activities needed to serve timber production and other resource needs; providing direction, training, monitoring systems, and budgets to ensure that sale planning and layout is done by competently applying the best technology for logging, road, and related transportation system requirements; and by reviewing current designations to see where goals for all resources can be satisfied by intensifying timber management practices on the best economic sites
2. Provide access for economically viable salvage and intermediate entry opportunities through appropriate use of Forest road and trail funds
3. To encourage the use of biomass for energy production, concentrating on the cogeneration approach, where such energy production would serve wood utilization facilities

4. To reduce loss of usable forest material from fire, insects, and disease on both regulated and unregulated lands by accelerating harvest from susceptible live, green stands (an action that may involve departure from the nondeclining even flow provision in NFMA); by thinning susceptible live, green stands; by selecting tree species through harvest and reforestation programs; by selecting logging systems to minimize damage to residual stands; and by selecting trees that are resistant to disease (for example, blister rust)
5. To investigate the feasibility of, and need for departures from, nondeclining even flow to shift timber targets among individual forests or groups of forests to reduce high mortality losses or improve age class distribution, reduce adverse economic impacts upon a community, and meet RPA program goals
6. To enhance cooperative programs in forest products utilization, timber stand improvement, forest pest management, and reforestation on private lands
7. To work with States and counties in planning a stable commercial forest land base

Watershed

Current Situation

Although the National Forests of the Pacific Northwest Region comprise only 23 percent of the land area, 44 percent of the Region's water originates on National Forests, and many communities, farms, and ranches depend upon water flowing from National Forest areas. Much of the water comes from snow and glaciers through surface and groundwater systems. Consequently, National Forests play an important role in supplying water during the period when demands for consumptive uses, such as irrigation, are highest. In addition, in contrast to many areas of the Nation, the quality of the surface and groundwater is generally very good on the National Forests, and there is an ongoing effort to maintain that quality.

Eighteen municipal supply watersheds on National Forests in Oregon and Washington have been formally recognized through signed agreements with the Secretary of Agriculture or Forest Service, through congressional legislation, or by Executive order. There are also numerous watersheds supplying water for domestic uses for which no formal agreement exists. A total of about 3.7 million acres of National Forest land are the direct source of water used for domestic purposes.

The Pacific Northwest Region contains numerous riparian ecosystems separated into two geographic areas. West of the Cascade Crest, the riparian ecosystems are characteristically narrower, more precipitous, and support vegetative communities that often lack definition when compared to vegetative communities on adjacent uplands. The riparian ecosystems east of the crest are generally wider, less precipitous, and have vegetative communities that are distinctly different from those on adjacent uplands.



Riparian areas are unique ecological components of watersheds.

On State and private lands, through a variety of USDA programs, the Forest Service provides technical assistance to improve watershed management. These include various river basin programs, emergency flood prevention, watershed protection, and resource conservation and development. The emphasis of Forest Service participation is land and resource management rather than facility construction. USDA river basin studies collect and assemble planning information at the watershed, State, or Regional level for incorporation into Regional Forest Service land and resource management plans.

The Forest Service has participated with other Federal and State agencies in preparing the framework Columbia River Basin Plan. From this, plans for the Willamette, Puget Sound, Okanogan-Methow, and Yakima river basins were developed. These Water Resources Council plans are the basis for measuring the consistency of other resource planning, including Forest Service plans. In addition, the Forest Service has worked with other USDA agencies to develop the Palouse, Entiat, and Yakima sedimentation studies and is currently involved in studying areas of southeast Washington and north-central Oregon.

Currently, total withdrawals of surface water within Oregon and Washington average 53 million acre-feet annually. Approximately 75 million acre-feet of water originates on the Region's National Forest lands. Withdrawals are projected to reach 201 million acre-feet by the year 2020. About 90 percent of the use is for irrigation.



Forty-four percent of the Region's water originates on National Forest land.

Issues and Limiting Factors

To achieve water quality that will not require filtration or further treatment, some municipalities have pressed for restrictions on all activities, including recreation and timber management, in municipal watersheds. Managing for municipal water supplies on additional National Forest lands may

lead to strong pressures to limit or eliminate other uses. In addition, much of the public concern relating to water quality is based on a desire for pure water that is associated with pristine watersheds.

Other water quality issues are related to timber management activities, such as road construction and logging, that may result in mass waste, siltation, or destruction of riparian habitat. A high concentration of livestock in riparian areas also may cause degradation of water quality, influence flow characteristics, and reduce productivity in fish and wildlife habitats. Most riparian areas east of the Cascades have been heavily used by domestic livestock for the last 70 to 100 years and have been used for other activities such as timber harvest, recreation, road construction, and mining. These activities have significantly altered some riparian areas and, as a result, some of these areas currently are not providing for maximum multiple-resource uses, such as fish and wildlife, timber, recreation, watershed management, and livestock grazing.

Sediment is the primary pollutant from forest land, but forest lands account for a very small percentage of all the sediment caused by humans in the Region's water supply. The Water Resources Council and USDA river basin studies show sedimentation from agricultural lands to be significantly higher, partially because of the annual cropping and resultant soil disturbance. State and Federal remedial programs, therefore, have focused on agricultural lands rather than forest lands.

Several factors affect watershed management. Nonindustrial private landowners have varying objectives, which may not emphasize watershed management, and they lack the incentives or the knowledge to improve management. Gaps in data or information also limit watershed management. For example, although there are considerable economic data available on commodity resources such as timber, little data exist on intangible resources such as water quality. In addition, knowledge about bacteriological relationships to the forest environment is limited.

Opportunities

The following opportunities have been identified:

1. To develop strong public support for the Forest Service's efforts to manage for high water quality
2. To work with local governments and other agencies to provide coordinated Forest resource planning
3. To monitor, evaluate, and correct the effects of most land management practices through modification of practices without major financial adjustments

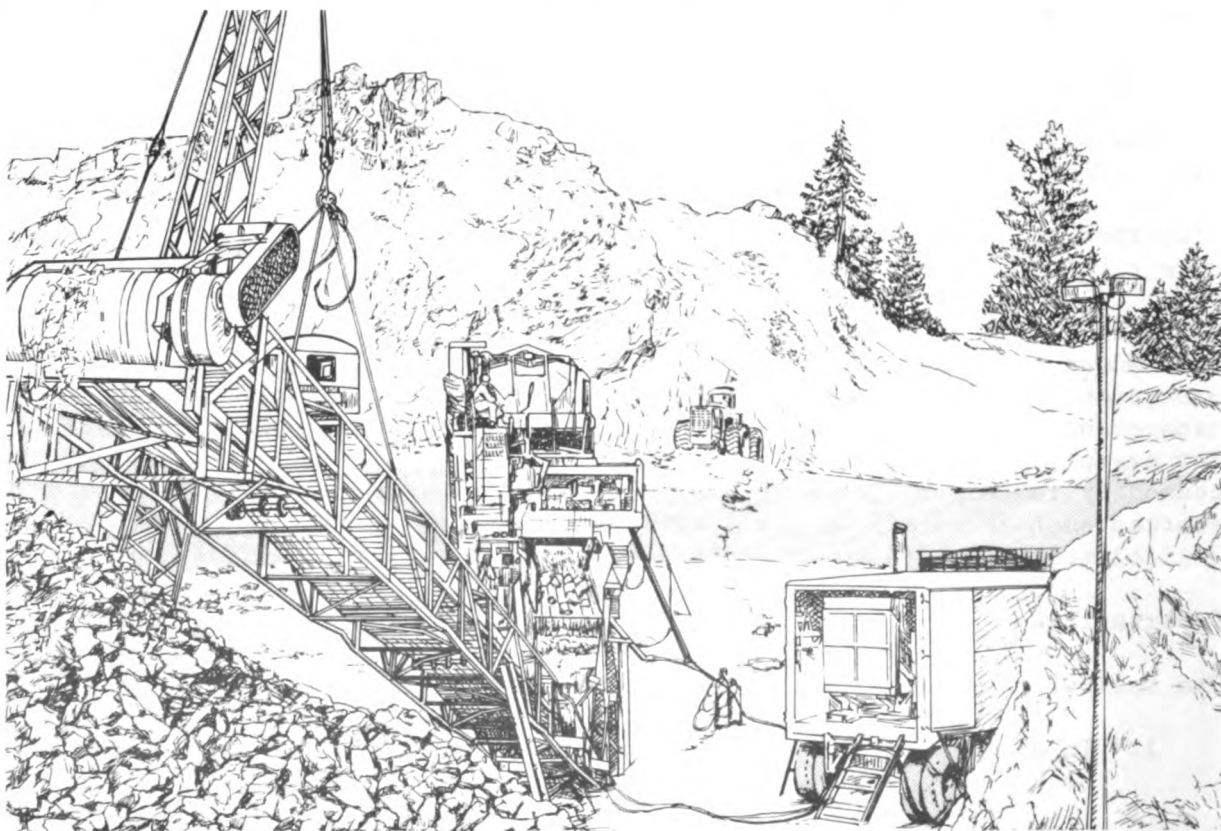
Minerals and Rock Resources

Current Situation

Currently, large energy and mineral resource companies are exploring and developing mineral resources on National Forest lands in the Pacific Northwest Region, where locatable resources include gold, silver, copper, iron,

mercury, molybdenum, chromium, nickel, lump pumice, uranium, and semi-precious gems. Several large copper, molybdenum, and gold deposits have been found, and other deposits are being evaluated. At the present time, there are more than 20,000 claims, and if valuable mineral deposits are found, some of these claims may be patented.

Rock material resources include rock, sand, and gravel of adequate quality to be used as construction materials. These materials provide the primary material for building and maintaining the Forests' roads and trails. National Forest requirements for these materials within the Region is expected to continue at or near the current level of 9.2 million tons per year. In addition, about 15 percent of this material is provided for other agencies and public material sales. As private resources are depleted, public need for these materials is expected to increase.



The National Forests provide a base for mineral exploration and development.

Issues and Limiting Factors

Three management concerns have been identified for locatable mineral resources. First, there is the need to maintain opportunities for meeting national mineral needs, particularly needs for strategic minerals, in a timely and efficient manner. A related concern is the availability of

significant mineral resource areas for exploration and development. Second, coordination of subsurface and surface resource management must be effective and timely. The third concern is the need to facilitate orderly operation of legitimate mining enterprises. Although mining activities generally are confined to relatively small parcels of land, the orderly development of significant mineral resources will probably have some impact on other resources--especially visual resources.

Two principal management problems pertaining to rock resources concern the uneven distribution of suitable rock materials throughout the Region and past inefficient use of rock resources. These problems contribute to increased transportation system construction and operating expenses, timber sale administration delays and cancellations, and adverse effects on Forest visual resources and air and water quality standards.

For locatable minerals, the following limiting factors have been identified:

1. Mining activities are heavily influenced by market conditions, which frequently result in sporadic mining operations.
2. Mining may have significant effects on other resources in certain areas.
3. There may be a lack of technical ability to respond to major, short-term increases in mining activities.
4. Both physical siting difficulties and forest management objectives may constrain mining opportunities to some extent.

Opportunities

There is an opportunity to refine Regional policy for managing areas having a significant strategic and critical mineral resource potential. This would provide a more definitive basis for ensuring that opportunities for development are maintained; for coordinating subsurface and surface resource planning; and for facilitating ongoing exploration and assessment. There is also an opportunity to develop a Regional policy for rock resources that will provide an administrative framework for assessing resource reserves; for responding to the future needs of the Forest Service, the public, and private users; and establishing practices that will ensure conservation of nonrenewable resources.

Energy Resources

Current Situation

The Region has no known oil resources at this time and only limited coal and natural gas resources. The abundance of large rivers and mountainous topography, coupled with large amounts of public works money available, created an almost total hydroelectric base. However, many of the hydroelectric sites are not fully developed because of the economics of the time, and it is necessary to reevaluate existing hydroelectric and water storage dams and reservoirs to determine remaining potential.

Major companies are actively exploring for oil, gas, and geothermal resources in the Region, and the number of oil and gas lease applications on National Forests has increased recently--more than 1,800 in all, with 240 leases in effect. Coal reserves also exist within the National Forests and are currently being evaluated.

The potential for geothermal energy in the Pacific Northwest Region has been rated by the U.S. Geological Survey as very high in the Cascades, particularly in Oregon. The total potential is estimated at approximately 3×10^{16} Btu's, or the equivalent of 1×10^{10} megawatts. The number of lease applications (650) and issued leases (30) are indicative of the degree of interest in this resource.

Exploration and development of oil, gas, coal, and geothermal resources will continue at an accelerated rate during the remainder of this decade, but they will likely decrease during the 1990's if there are no major discoveries. Although renewable energy resources, such as wind, solar, and biomass, contribute only a very small portion of the energy production from the National Forests, solar collector and wind generation site development probably will become more significant by about 1990.

Approximately 300,000 acres of forest land within the Region's National Forests are used for energy and water resources development and transmission. Because of the nature of energy development, particularly hydroelectricity, energy and water resource developments often occupy the gentler terrain and more productive forest lands. Thus, forest productivity is affected more than the 300,000 acre amount would indicate. Future energy developments on National Forests could cause changes in forest user activities. While the actual mix of developments and their cumulative impact are difficult to quantify, an estimated 1.5 million acres of additional energy development occupancy will occur by 2020.

Issues and Limiting Factors

The primary public issue regarding energy resources is summarized by the question: "How can the National Forests be better used as major contributors of both renewable and nonrenewable energy resources, such as hydro-power, geothermal, wood, wind, solar, coal, oil, gas, and uranium?"

Factors that limit the management of energy resources are several. Administrative problems have been created because agency responsibility for the development for energy sources is fragmented, and the role of the Forest Service in developing some of these resources is poorly defined. In addition, developing many energy resources has significant effects on the environment and the productivity of other resources.

Opportunities

The following opportunities for energy management have been identified:

1. To conduct more pilot projects to measure the economic and environmental effects of alternative energy development

2. To develop more efficient means to provide access to renewable energy resources; for example, develop more efficient methods for transporting wood fuel to be used for heat energy
3. Provide access to fuelwood and sites for wind generation and small hydroelectric facilities to rural and small community populations
4. Refine Regional policies and procedures to encourage and facilitate exploration and development of energy resources in coordination with other resources

Human Resources Programs

Current Situation

Involvement with human resources programs in the Pacific Northwest Region dates back to the 1930's, when the Civilian Conservation Corps was formed. At present, the Region is involved in the following human resources programs:

1. Job Corps
2. Youth Conservation Corps
3. Senior Conservation Employment Program
4. Volunteers in the National Forests
5. Other miscellaneous programs, such as College Work Study and Work Incentive Programs

Issues and Limiting Factors

Human resources programs in the Pacific Northwest Region provide an important source of labor for high priority and otherwise unfunded resource management projects. During times of restricted personnel ceilings and funding shortages, they become even more important. There are some restrictions and problems involved, however. Human resources programs may not be used to displace employees or to do work already funded. Because funding for many of the programs comes from other agencies and because funding levels are subject to outside political pressures and changing socioeconomic conditions, it is difficult to make long-term plans for utilization of some programs.

Unless economic conditions in the United States drastically improve, it is quite likely that the human resources programs will continue to exist in some form in the foreseeable future. The Forest Service will probably continue to be called upon to operate programs because it has the capability to provide rural employment and training opportunities on the National Forests and the expertise and organization necessary to host such programs.

Limiting factors include the following:

1. Managers cannot rely on Human Resources Programs to accomplish critical projects, because funding for Human Resources Programs is discontinuous and dependent upon fluctuation in the national economy.
2. Housing facilities to accommodate fluctuating programs are inadequate.
3. There is a lack of trained manpower specialists on National Forests to administer human resources programs.

Opportunities

There is an opportunity to improve coordination between State-managed funds and personnel and National Forest System jobs and manpower specialists.

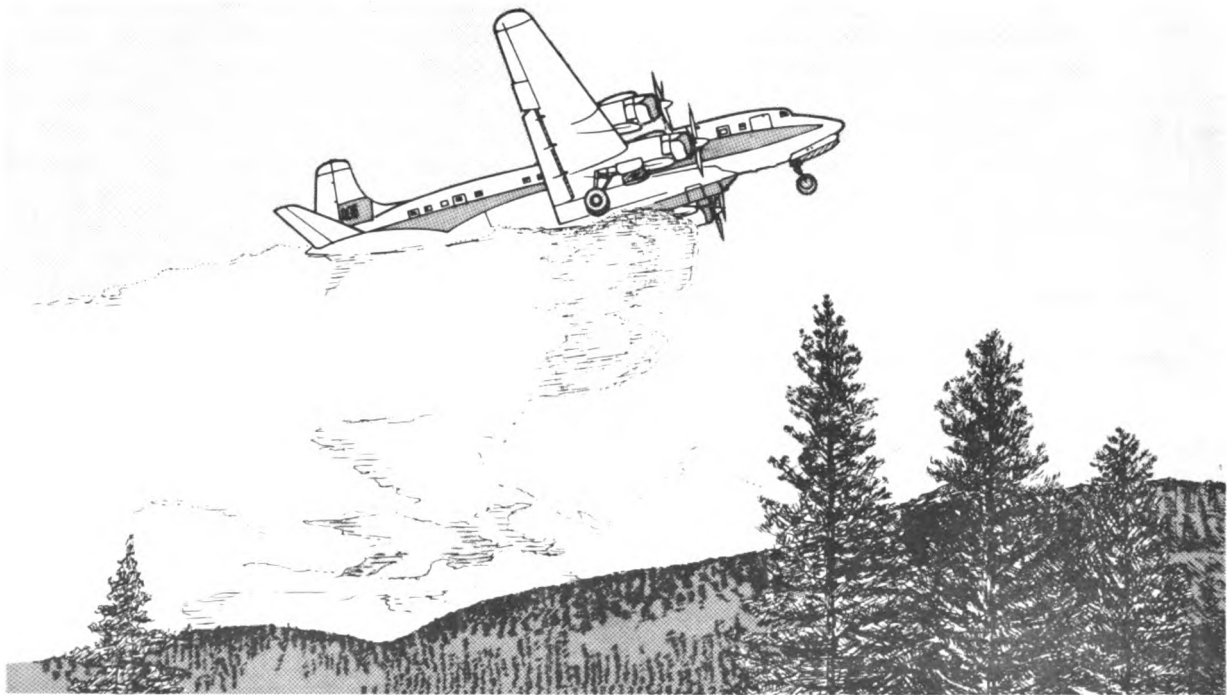
Fire Management

Current Situation

During the 10-year period, 1970 through 1979, 20,985 fires burned 253,216 acres in the Region's National Forests. Extremely dry summers, coupled with steep terrain, heavy fuel loading, and limited access are factors contributing to large project fire occurrence. Fire prevention and protection have been developed and integrated through cooperative agreements with State and other Federal organizations. Both the Washington Department of Natural Resources and the Oregon Department of Forestry, which are responsible for protecting many scattered small ownerships as well as some of the major industrial timber company lands, have fire management organizations with excellent prevention and suppression capabilities. State programs are financed by a mixture of landowner assessments, State funds, and Federal cooperative funds.

In many locations, State-protected lands lie within or adjacent to National Forests, thus State agencies are responsible for suppression-related actions for any fire within their protected areas.

Historically, Forest Service fire management policy has directed that forest and range fires be attacked with sufficient force to gain control of the fire as quickly as possible. Each wildfire was suppressed regardless of vegetative type, burning conditions, fuels, or land management objectives. By the mid-1960's and early 1970's, professionals in many fields recognized that both wildfire and prescribed fire have an important role to play in forest and range ecosystems. Prescribed fire is used primarily to prepare sites for regeneration and to dispose of hazardous fuels. Forest Service policy also has recognized a changing role for fire management. In February 1978, national policy was revised to provide well-planned and executed fire protection and use programs that are cost effective and responsive to land and resource management goals and objectives and supportive of RPA outputs.



Dry summers, when coupled with the Pacific Northwest Region's steep terrain and heavy fuel loading, provide the ingredients for large project fire occurrences.

Issues and Limiting Factors

Fire management was identified as a management concern because current fire management policies are not yet fully integrated with other resource management objectives. Analysis indicates that fire management concerns can best be handled through functional coordination and, therefore, does not require a change in management direction.

The following limiting factors have been identified:

1. Air-quality emissions limitations (See the air-quality section.)
2. Public concern about the appearance of fire-blackened areas, especially in wilderness areas
3. Inability to protect municipal watersheds on National Forest lands
4. Differing attitudes among Federal, State, and private protection organizations regarding fire as a management tool

Opportunities

Opportunities to improve fire management include the following:

1. To develop a Regional policy that provides flexibility in funding fire activities, an interdisciplinary approach to fire management, development of expertise appropriate to support shifts in programs, and involvement of cooperating organizations and the public
2. To implement a concerted information program to be involved, not only with the public and their representatives, but also with State and other Federal agencies, the timber industry, and within the Forest Service itself
3. To develop more fire cooperatives that involve local governments
4. To emphasize the use of prescribed fire as a management tool to improve resource production (such as wildlife habitat and grazing potential)

Air Quality

Current Situation

The Forest Service has two distinct air quality responsibilities. One is to deal with the potential for unacceptable atmospheric impacts that result from emissions from Forest Service activities. The other is to deal with the potential for unacceptable impacts upon National Forests that result from emissions from activities of others. Managing emissions from Forest Service activities will continue to be a dominant concern, but the second role is rapidly emerging to include participation in permit application reviews and protection of air quality-related values in wilderness.

Concern with emissions from Forest Service activities is a consequence of prescription burning of residues from timber harvesting (best known as "logging slash"). Of a total of approximately 12 million tons of debris created annually by timber harvest operations, plus the tonnage contributed by the backlog slash treatment program, 5.25 million tons of slash are actually burned or consumed annually. With the growth of the environmental movement and the passage of the Clean Air Act in 1963, slash-fire smoke was perceived as a major pollutant.

Until recently, slash burning was carried out largely during the fall months, when thousands of tons of debris were burned during a 6-week to 10-week period. This loading of the atmosphere, coupled with unfavorable atmospheric conditions for dispersion of the smoke, occasionally produced pollution episodes.

Current smoke management plans schedule burning according to weather conditions and the location of the burn site relative to smoke-sensitive areas; burning is allowed only when atmospheric conditions carry the smoke away from populated areas. For most Forests, this means that the smoke is carried toward areas, such as wilderness, where only the slightest reduction in air quality is allowed. The Oregon Department of Environmental

Quality administers agricultural burning, including the grass field burning in the Willamette Valley. From mid-July to mid-September, forestry burning is restricted in favor of field burning.

With one exception--Spokane, Washington--the designated smoke-sensitive areas in the Region are west of the Cascade Crest. However, special consideration is given to the orchard areas of Okanogan, Chelan, Douglas, Kittitas, Benton, and Yakima Counties in eastern Washington, because orchard growers were concerned about the potential effects of smoke obscuring the sunlight during the late summer and fall when fruits are ripening. West of the Cascade Crest, the designated areas are continuous from the Canadian border south along the east side of Puget Sound to Vancouver, including Port Angeles and the area around Grays Harbor on the south-central coast. In Oregon, the entire Willamette Valley is included, as well as Coos Bay, Roseburg, Grants Pass, and all of the Rogue Valley. Forests affected by the smoke management plans include all of the west side Forests in both States and the Deschutes National Forest.

Congress has mandated that the prevention and control of pollution at its source are the responsibilities of State and local authorities. The State governments, therefore, play a critical role in regulating and enforcing air quality standards. Although the Environmental Protection Agency must approve all State Implementation Plans for adequacy and compliance with Federal laws and standards, States are essentially free to act as they see fit. Indeed, State standards can be more restrictive than Federal standards.

To manage smoke generated by agricultural and forestry burning, a Memorandum of Agreement was signed in 1968 by State, Federal, and private fire control agencies and the Oregon Department of Environmental Quality to initiate "a cooperative slash/smoke management plan to minimize or eliminate slash/smoke accumulation in designated areas of high population density." The State Forester, who has the legal authority to control open burning on forest lands, serves as coordinator. During 1971, a similar smoke management program was developed for the State of Washington, whose plan is administered by the Department of Natural Resources, with technical assistance provided by the Department of Ecology.

In addition to the previously discussed smoke management plans, the Clean Air Act (P.L. 88-206), as amended, provided for the establishment of National Ambient Air Quality Standards (NAAQS) for pollutants. By sampling the air in the Pacific Northwest, "nonattainment" areas (areas in violation of NAAQS standards) were identified, which closely correspond to the designated smoke-sensitive areas.

Separate but related provisions of the 1977 Clean Air Act Amendments have affected Forest Service concerns with both smoke management and other air-quality matters. Provisions for Prevention of Significant Air Quality Deterioration make protection of air quality-related values (including visibility) an "affirmative responsibility" of the Federal land managers and the Federal official with direct responsibility for designated Class I areas. Within this Region, 16 Class I areas are National Forest Wildernesses, and 4 are National Parks. The Amendments separately amplify visibility protection within these same Federal Class I areas, further mandating involvement of the Federal land managers. State Implementation

Issues and Limiting Factors

Increasing concern with urban emissions concentrations resulting from homes heated by wood could limit this as a residues disposal opportunity, unless available control technologies are brought to bear, instead of prohibitions.

Opportunities to address the air-quality management issue include limiting fuel sizes and amounts to be prescription burned and improving upon methods for predicting potential impacts. Fuel size may be limited by fuel moisture specifications (with less total fuel to burn and less residual smoke). Fuel amount may also be limited by continuing to improve utilization programs. Predictions can be improved by obtaining better input data for emissions production, transport, and dispersal (with these predictions helping to determine when to request opportunities to burn through existing cooperative smoke management programs).

Current Situation

The lands program is a support program designed to assist in land management planning, identify National Forest System ownership, and provide land-ownership adjustments, rights-of-way acquisition, land-use administrations and multiresource studies.

The National Forests are managed for a variety of purposes to satisfy both short- and long-term public needs. In recent years, there have been increasing demands for the use and occupancy of intermingled lands within the National Forests; however, management philosophies and objectives for the resources on private lands often differ from those for the National Forests.

Management practices on private lands can affect National Forest resource management and, conversely, National Forest management can have impacts on private lands. An example is the increasing demand for mountain subdivisions or recreation homesites in public land areas managed for multiple use. First, there is the demand to use public lands for access, utility routes, and water supply. Once established, the occupants then frequently oppose any Forest Service management activity, such as timber harvesting, wildlife habitat improvement, and recreation development, that affects their use or enjoyment of the adjacent public lands. The occupancy and use of the private lands also affect big-game areas and other wildlife habitat areas and increase the danger of wildfire.

Timber management practices on non-Federal lands also can affect National Forest management options. Private logging practices often adversely affect visual resources, fish and wildlife habitat, threatened and endangered species, air and water quality, cultural resources, and slash disposal. These are particularly critical in large areas of intermingled ownership. Also, public objectives for scenic routes cannot be met unless the entire route is managed for visual quality. Removing old-growth wildlife habitat on private lands places an additional burden on public lands to maintain the habitat. The transportation system also can be overloaded from activities conducted simultaneously on Federal and non-Federal lands.

Working with local governments has been one of the most fruitful ways to ensure that management of intermingled ownerships is compatible. The Forest Service will continue to emphasize local government control over uses on private lands.

Issues and Limiting Factors

While the Forest Service may find it is in the public interest to control uses of certain resources for the public benefit, other owners may not limit uses that are not seen as detrimental to their primary objectives. Areas of potential management conflict result.

The Deschutes, Wenatchee, and Okanogan National Forests are most affected by subdivision and recreation development because of their proximity to major transportation routes, and the opportunities for both summer and winter recreation attract many users from the more populated west side.

Because of the broken, rough terrain and heavy rainfall that contribute heavily to potential soil erosion, intermingled National Forest ownerships on the western slopes and crests of the Cascades experience greater impact from private timber harvesting practices. The Snoqualmie, Wenatchee, Gifford Pinchot, and the Willamette National Forests have greater potential for encountering this kind of problem.

Landownership management planning is limited by the following factors:

1. Local government resistance to increased Federal controls through acreage increases or limitation of the tax base by substituting Federal control for local governmental control.

2. Private nonindustrial landowners are likely to have diversified land management objectives and may be reluctant to modify practices that would adversely affect net cash flow or other objectives.
3. Lack of authority to enter into cooperative agreements to provide uniform, coordinated management objectives.
4. Reluctance of owners to accept land appraisal values.
5. Inability to consolidate ownership through disposal of isolated parcels of National Forest land that have potential resource value (for example, cultural, wildlife and fish habitat).

Opportunities

Opportunities to address issues resulting from intermingled ownerships include the following:

1. For local and coordinated Forest resource planning
2. For cooperative management agreements with other Government agencies and landowners
3. For assistance to adjacent owners to reduce liability or cost of public use of private lands
4. To modify National Forest objectives to compensate for the management activities conducted on other intermingled ownerships (for example, Bull Run Watershed)

Because the Forest Service is required by law to protect and enhance threatened and endangered species and cultural resource sites on National Forest lands, there is an opportunity to encourage protection and management of these resources on intermingled private ownerships through coordination with landowners and State agencies. In addition, there is an opportunity to increase management options and protection through land adjustments.

Transportation

Current Situation

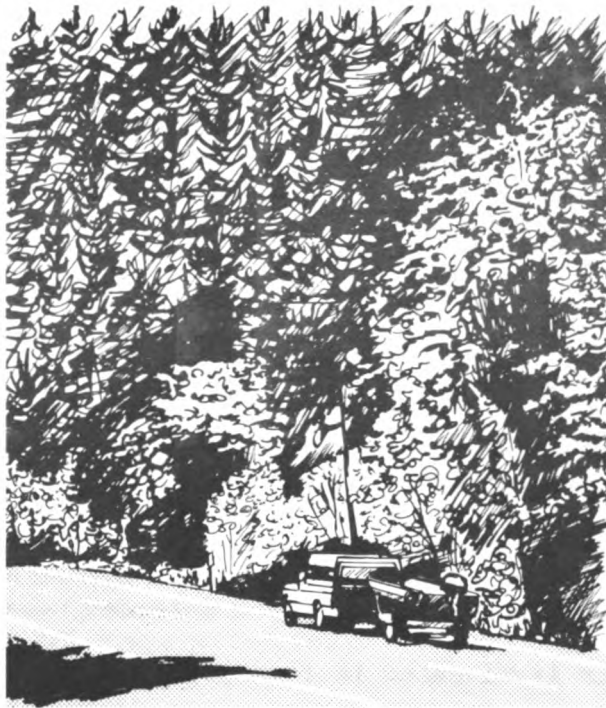
The National Forest transportation system in the Region includes 85,000 miles of roads and 14,000 miles of trails, making the Forest Service one of the largest road system managers in the Pacific Northwest. Each year for the past 5 years, resource targets have required an average of 1,000 miles per year of new road construction and 2,000 miles of reconstruction, involving roads of all types in all types of terrain. An average of 135 miles of trails are constructed or reconstructed annually.

Because State, county, and Federal roads are interconnected, any action involving one system may affect the others. States and counties are aware of these potential effects and want to be involved in changes in the National Forest program.

The primary need for constructing or reconstructing roads today is to provide access to timber harvest areas and to provide the facilities needed by the logging system to be used. As harvest schedules have progressed, more and more difficult terrain is becoming accessible, which increases the potential for adverse effects on other resources.

To extend the hauling season to move approximately 5 billion board feet of timber annually, many roads are surfaced with gravel or pavement to avoid excessive road damage during wet weather, soil disturbance, and excessive maintenance costs. Some roads are wider than several years ago to accommodate the equipment required by cable yarding systems. The typical yarder weighs 95 tons and requires a 12-foot to 14-foot road width. These yarders make it possible to have fewer roads; but the roads must have better foundations, surfacing, and bridges to support the weight.

Many of today's road features--the retaining walls, drainage structures, and similar permanent devices--may seem overbuilt to some, but, in fact, often make it possible to provide access in steeper country and to stabilize roads that might otherwise have intolerable effects on the surrounding resources. Improved technology can significantly reduce some of the impacts of road building.



The 19 National Forests of the Pacific Northwest Region contain 85,000 miles of road and 14,000 miles of trail.

Issues and Limiting Factors

Problems associated with roads in the National Forests have not changed much during the last 15 years. Such problems have included overbuilding, loss of wildlife habitat, degradation of riparian areas and fish habitat, and user conflicts. The major transportation system issue of today can be summarized as follows: "How should the various objectives of different interest groups be met by the Forest Service in managing roads and trails in the Region?" A number of factors need to be considered in trying to resolve this problem, including soil movement in steep terrain, conflicts among recreation users, and the relationship between roads and trails. Wildlife biologists are alarmed at the invasion of previously undisturbed habitat, and fisheries biologists see increased danger of water quality degradation.

Section 8(c) of the NFMA regulations states that "roads constructed on National Forest System lands shall be designed to standards appropriate for the intended uses considering safety, cost of transportation, and impacts on the land and resources." Both the public and those who are involved with Forest management understand the need to define the intended use for a particular road and to build the most appropriate type of road for that use, the objective being to avoid "overbuilt" roads that are more permanent, elaborate, or longer than necessary.

Limiting factors that have been identified include conflicts between users of the transportation system, often resulting from conflicting desires for land use; limited energy supplies, particularly fossil fuels; limited capital for investments in transportation systems to serve nonindustrial users; and low funding level for Forest highways in the Region, which will curtail land management activities.

Opportunities

The following opportunities for transportation management have been identified:

1. Develop objectives for resources and transportation as integral parts of management prescriptions
2. Identify intended uses of resources; establish guidelines and standards for transportation development, operation, and maintenance that are appropriate for the intended uses
3. Increase public involvement in transportation planning
4. Plan for cost sharing programs to encourage appropriate road systems to serve intermingled State, private, and National Forest lands
5. Provide technical assistance in proper road location and design on State and private lands
6. Coordinate with regulatory agencies to improve assistance to State and private landowners

Chapter 3

MANAGEMENT DIRECTION

OVERVIEW

This chapter describes the Regional goals, planning guidance, and new or significantly changed management standards and guidelines necessary to address the major issues and management concerns described in detail in Chapter 2. These issues encompass the national standards and guidelines required by the NFMA regulations (36 CFR 219.9(a)(5)) that are addressed at the Regional level to facilitate Forest planning. A description of the monitoring and evaluation necessary to determine and report achievements and effects of the Regional Guide also is given.

Management direction is stated in the form of Regional goals, standards and guidelines, and planning guidance. The RPA goals and objectives describe the "ends"—where we want to go. The standards and guidelines describe the "means" by which goals and objectives will be achieved, specifying actual regionwide criteria to be applied to Forest management activities. Planning guidance is provided to guide the uniform development, analysis, and presentation of the alternatives considered in the planning process for individual Forests. This guidance is not intended to limit Forest Plan alternatives, but rather to focus attention on Regional information needs and to ensure that a range of reasonable alternatives, based on Regional issues and concerns, is considered. The location and amount of land managed for specific objectives will be determined in the individual Forest Plans.

Planning guidance also includes the Pacific Northwest Region's share of the 1980 RPA Recommended Program. While assigned RPA objectives for the Region are firm, the resource targets assigned to individual National Forests are tentative and may be modified as a result of information produced by Forest-level planning. Individual Forests use the regionally assigned RPA targets as the basis for one alternative that is examined in the Forest planning process. Forest planning also examines alternatives with higher and lower resource outputs. The final, approved Forest Plan will serve as input for the next RPA Program update.

MANAGEMENT STANDARDS AND GUIDELINES

The NFMA regulations require the establishment and evaluation of standards and guidelines for five resource management practices. Standards for the management of the northern spotted owl are also included in accordance with the Chief's August 11, 1980, decision on an administrative appeal filed by the Oregon Wilderness Coalition, et al. In summary, standards and guidelines are proposed for the following items:

1. Harvest cutting methods
2. Maximum size, dispersal, and size variation of tree openings, and state of vegetation
3. Management intensity and utilization standards
4. Utility and transportation corridors
5. Air quality
6. Northern spotted owl habitat management

The silvicultural standards and guidelines in this Guide apply to commercial forest land in the National Forest System in the Pacific Northwest Region, except the Shelton Cooperative Sustained Yield Unit. For the Shelton Unit, the Olympic National Forest will examine these standards and guidelines for consistency with the Cooperative Unit Agreement. Those Regional standards and guidelines that are found to be consistent will apply. Where inconsistencies are found, specific standards and guidelines addressing those inconsistencies may be established during Forest planning.

Harvest Cutting Methods

Standard and Guideline 1-1

Both even-aged and uneven-aged harvest cutting methods will be used. The determination of which method is to be applied in a given situation will depend upon current land uses and will be guided by the selection criteria listed below. The identification of the commonly used regeneration harvest methods does not preclude using other methods as indicated by local circumstances and objectives. Even-aged harvest cutting methods will be the most commonly used methods in coniferous forests. Uneven-aged harvest cutting methods may be used when healthy, fully stocked, uneven-aged stands exist or can be created by identified treatments within a defined time period.

The selection criteria are:

1. The selected harvest cutting method must permit the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards and are designated for harvest.
2. The selected harvest cutting method must permit the use of an available and acceptable logging method that can remove logs and other products without excessive damage to the identified desirable residual vegetation.
3. The selected harvest cutting method must be capable of providing special conditions, such as a continuous canopy or continuous high-density live root mats, when required by critical soil conditions or as needed to achieve particular management objectives, such as streamside protection, wildlife needs, and visual enhancement.

4. The selected harvest cutting method must permit control of vegetation to establish desired numbers and rates of growth of trees, as well as vegetation needed to achieve other management objectives identified in site-specific silvicultural prescriptions.
5. The harvest cutting method selected will promote a stand structure and species composition that minimizes serious risk of damage caused by mammals, insects, disease, or wildfire, and it will allow treatment of existing insect, disease, or fuel conditions.
6. The harvest cutting method selected must meet resource and vegetation management objectives identified in the Regional Guide and Forest Plans. Harvest cutting methods to be used on specific areas may be identified in Forest Plans, in environmental assessments, or in silvicultural prescriptions that are written or reviewed by a certified silviculturist.

A detailed discussion of each criterion and the specific standards to determine the preferred harvest cutting method follows.

1. The selected harvest cutting method must permit the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards and are designated for harvest.

The timber stand that develops from the use of a selected harvest cutting method must be capable of producing a volume of marketable trees harvested at intermediate cuts sufficient to achieve a positive economic operation and must permit harvest of all trees, at each commercial harvest operation, that meet utilization standards and that are not required in the residual stand to achieve desired stand structure and density.

2. The selected harvest cutting method must permit the use of an available and acceptable logging method that can remove logs and other products without excessive damage to the identified desirable residual vegetation.

Table 3-1 displays compatibility and considerations of logging systems for commonly used harvest cutting methods. In general, the system that can meet established land management requirements, such as protection of soil, water quality, residual stands, and visual resources, with the least cost should be used.

3. The selected harvest cutting method must be capable of providing special conditions, such as a continuous canopy or continuous high-density live root mats, when required by critical soil conditions or as needed to achieve particular management objectives, such as streamside protection, wildlife needs, and visual enhancement.

Table 3-2 displays which methods develop the stand conditions that are required to meet resource management objectives over the longest period of time.

Table 3-1

Compatibility of Logging Systems With Commonly Used Harvest Cutting Methods

Logging System	Harvest Cutting Method		Clearcut	Seed Tree	Shelterwood	Group Selection	Single-Tree Selection
	Normal Operating Considerations						
Rubber-Tired Skidder	Stable soil not subject to compaction damage, downhill slopes less than 30%, uphill slopes less than 10%		A	A	A	A	A
Hard-Tracker Crawler Tractor	Stable soil not subject to compaction damage, downhill slopes less than 30%, uphill slopes less than 10%		A	A	A	A	A
Horse	Stable soil, downhill slope less than 30%		N	N	N	N	A
Highlead	Stable soil without convex topography up to 1,200 feet slope distance uphill, up to 600 feet slope distance downhill		A	N	N	N	N
Single Span Skyline Without Slack Pulling Carriage	Where topography and other conditions permit one end suspension and reasonable payloads; full suspension if necessary and feasible		A	N	N	N	N
Single Span Skyline with Slack Pulling Carriage	Same as above		A	A	A	A	A
Multispan Skyline with Slack Pulling Carriage	Same as above except where topography does not provide single span deflection but does meet multispan requirements		A	A	A	A	A
Balloon	Use when log suspension requirements, road and landing constraints cannot be met with skyliners, if balloon equipment is available		A	N	N	N	N
Helicopter	Use only where cheaper systems cannot meet land management objectives		A	A	A	A	A

A = Generally acceptable

N = Generally not recommended

Logging System references: Cable Logging Systems, USDA Forest Service, (Unpublished) 1974, Studier, Donald D. and Virgil W. Binkley. Small Yarder Comparison, USDA Forest Service, (Unpublished) 1979, Seabaugh, James and Vern Yerkes.

Cable Harvesting Systems For Small Timber, Vermont Department of Forests, Parks and Recreation, 1979, Hawkes, Gerry E.

Timber Sale Preparation Guide for Helicopter Logging, USDA Forest Service (Unpublished).

Table 3-2

**Commonly Used Harvest Cutting Methods
that Achieve Desired Forest Character**

Desired Character	Harvest Cutting Method	
	Even-Aged	Uneven-Aged
Continuous Site Occupancy with Trees	Shelterwood	Single-Tree Selection
High-Density Live Root Mat	Shelterwood	Single-Tree Selection
Mosaic of Forest and Openings	Clearcut, Seed Tree, and Shelterwood	Not Applicable
Maximum Wildlife Species Diversity	Clearcut	Not Applicable
Maximum Tree Species Diversity	Shelterwood	Group Selection

4. The selected harvest cutting method must permit control of vegetation to establish desired numbers and rates of growth of trees, as well as vegetation needed to achieve other management objectives identified in site-specific silvicultural prescriptions.

Commonly used harvest cutting methods that achieve certain desired regeneration and growth rates are displayed in Table 3-3. The harvest cutting methods displayed in Table 3-4 maximize the specific vegetation emphasis that is listed; they may not be suitable for providing the other vegetative conditions.

5. The harvest cutting method selected will promote a stand structure and species composition that minimizes serious risk of damage caused by mammals, insects, disease, or wildfire, and it will allow treatment of existing insect, disease, or fuel conditions.

The appropriate method usually varies with local conditions. However, certain damaging agents are uniformly mitigated by specific silvicultural treatments, as shown in Table 3-5.

6. The harvest cutting method selected must meet resource and vegetation management objectives identified in the Regional Guide and Forest Plans. Harvest cutting methods to be used on specific areas may be identified in Forest Plans, in environmental assessments, or in silvicultural prescriptions that are written or reviewed by a certified silviculturist. An exception occurs where harvest cutting methods are otherwise provided for by legislation or regulation.

Table 3-3

**Commonly Used Harvest Cutting Methods that Achieve
Desired Regeneration and Growth Rates**

Vegetation Zones ¹	Aspect	Harvest Cutting Method ²	
		Even-Aged	Uneven-Aged
<i>Picea sitchensis</i> (Sitka Spruce)	All	Clearcut	Not Applicable
<i>Tsuga heterophylla</i> (Western Hemlock)	North	Clearcut	Group Selection
	South	Clearcut and Shelterwood	Group Selection
Mixed Conifer and Mixed Evergreen	North	Clearcut and Shelterwood	Not Applicable
	South	Shelterwood	Group Selection
<i>Pinus ponderosa</i> (Ponderosa Pine)	All	Shelterwood	Group Selection
<i>Abies grandis</i> (Grand Fir) and <i>Psuedotsuga</i> <i>Menziesii</i> (Douglas-Fir)	All	Shelterwood and Clearcut	Group Selection
Subalpine Forests	All	Shelterwood	Single-Tree Selection

¹"Natural Vegetation of Oregon and Washington," USDA, Forest Service, Gen. Tech. Report PNW-8, 1973.

²Regional Silviculture of the United States, 2nd Edition, 1980, John W. Barrett, Editor.

Table 3-4

**Commonly Used Harvest Cutting Methods that
Achieve Desired Vegetation Emphasis**

Vegetation Emphasis	Harvest Cutting Method	
	Even-Aged	Uneven-Aged
Wildlife Forage	Clearcut	Not Applicable
Livestock Forage	Clearcut	Group Selection
Woody Vegetation ¹	Clearcut	Not Applicable
Herbaceous Vegetation	Shelterwood	Group Selection, Individual Tree Selection
Seedling and Sapling Tree Growth Rate	Clearcut	Not Applicable
Tree Seedling Survival on Southwest to Southeast Aspects ²	Shelterwood	Group Selection

¹"Regenerating Oregon Forests," by Cleary, Greaves, and Hermann, 1978.

²"Results of Shelterwood Harvesting of Douglas-fir in the Cascades of Western Oregon," Richard Williamson, PNW-171, 1973.

Table 3-5

**Commonly Used Harvest Cutting Methods Favorable
to the Reduction and Treatment of Damaging Agents**

Damaging Agent	Important Factors	Harvest Cutting Method	
		Even-Aged	Uneven-Aged
Dwarf Mistletoe or Phellinus weirii ¹ (Root Rot)	1. Removal of infected tree species 2. Elimination of disease- spreading mechanism	Clearcut	Not Applicable
Wildfire	1. Ability to treat created fuels 2. Avoidance of continuous fuel	Clearcut and Shelterwood	Single-Tree and Group Selection
Windthrow ²	1. Maintenance of stand density 2. Design of cutting pattern 3. Location with respect to topography and degree of storm hazard	Clearcut	Single-Tree and Group Selection
Gophers ³	1. Avoidance of habitat creation	Shelterwood	Single-Tree and Group Selection

¹"Biology and Classification of Dwarf Mistletoes Agriculture Handbook No. 401," Hawksworth, Frank, and Delbert Wiens, 1972.

²"Windthrow Around Staggered Settings in Old Growth Douglas-fir, 1956," Henry Gratkowski, Forest Science.

³"Response of Gopher Population to Silvicultural Practices in Central Oregon." Victor Barnes, Jr., pp. 167-175, Symp. Proc.: Wildlife and Forest Management in the Pacific Northwest.

Size and Dispersal of Openings and State of Vegetation

Standard and Guideline 2-1

Forest openings created by the application of even-aged harvest cutting methods shall be limited to a maximum size of 60 acres in the Douglas-fir type of the coastal Douglas-fir zone and to a maximum size of 40 acres for all other forest types in the Pacific Northwest Region. Exceptions are permitted for natural catastrophic events (such as fires, windstorms, or insect and disease attacks) or on an individual basis after a 60-day public notice period and review by the Regional Forester. In addition, the limits may be exceeded by as much as 50 percent without necessitating review by the Regional Forester or 60 days public notice when exceeding the limit will produce a more desirable combination of net public benefits and when any one of the following four criteria is met.

1. When a larger created opening will enable the use of an economically feasible logging system that will lessen the

disturbance to soil, water, fish, riparian resources, or residual vegetation. Such lessening is to be achieved by reducing landing or road construction, by enabling such construction away from unstable soil, or by reducing soil and vegetation disturbance caused by dragging logs.

2. When created openings cannot be centered around groups of trees infected with dwarf mistletoe or root rot and therefore need to be expanded to include these trees in order to avoid infection of susceptible adjacent conifers.
3. When visual quality objectives require openings to be shaped and blended to fit the landform.
4. When larger openings are needed to achieve regeneration objectives in harvest areas being cut by the shelterwood method and where destruction of the newly created stand would occur as a result of delayed removal of shelter trees. This exception applies only to existing shelterwood units and to shelterwood units under contract prior to approval of the Forest Plan.

Standard and Guideline 2-2

Created openings will be separated by blocks of land that generally are not classed as created openings and that contain one or more logical harvest units. These areas shall be large enough and contain a stand structure appropriate to meet resource requirements of the Forest Plan. Resource requirements may include wildlife habitat, watershed, landscape management, and others. Contiguous harvest units (cornering or otherwise touching) are not precluded, but must be considered as a single opening which must be created within requirements for size, exception procedures, and justification.

The total area of created openings contiguous to 30-acre or larger natural openings should normally not exceed one-third the size of the natural opening and not occupy more than one-third of the natural opening perimeter. Openings should not be created adjacent to any natural openings (regardless of size) unless adequate vegetation along the edge can be developed or retained in sufficient density to protect wildlife and visual management objectives. The determination of adequate vegetation will be made by an appropriate interdisciplinary team.

Standard and Guideline 2-3

A harvested area of commercial forest land will no longer be considered a created opening for silvicultural purposes when stocking surveys, carried out in accordance with Regional instructions, indicate prescribed tree stocking that is at least 4-1/2 feet high and free to grow. When other resource management considerations (such as wildlife habitat, watershed needs, or visual requirements) prevail, a created opening will no longer be considered an opening when the vegetation in it meets a particular management objective stated in the Forest Plan. For example, the objectives for a specified big-game winter range might require trees to be 20 feet tall before the adjacent stand may be harvested. In other instances, entry may be made sooner to meet specific resource or management requirements.

Management Intensity and Utilization Standards

Standard and Guideline 4-1

The management intensity to be used in determining harvest levels for the Region will vary with site productivity, timber species, other resource management objectives, and the time period when harvest is anticipated. Each of the following timber management practices may be used singly or in combination with others to calculate the appropriate management intensity:

1. Site preparation by chemical or mechanical means or by prescribed fire
2. Genetic improvement of tree stock
3. Reforestation by planting, seeding, or natural means
4. Growing stock protection from animals, insects, and diseases
5. Release and weeding by chemical or mechanical means or by prescribed fire
6. Precommercial thinning
7. Fertilization
8. Commercial thinning
9. Salvage
10. Final harvest

Standard and Guideline 4-2

Separate utilization standards are to be used in determining harvest levels for the first decade and future decades to the planning horizon. The standards displayed in Table 3-6 shall apply on all Forests, except where individual market areas or specific products present opportunities for standards specifying utilization of a higher proportion of the tree resource. In these Forests, planning will not be limited to the stated Regional utilization standards.

Air Quality

Standard and Guideline 6-1

The Forest Service will comply with applicable air-quality laws and regulations and coordinate with appropriate air-quality regulatory agencies.

Standard and Guideline 6-2

Wildfire will be suppressed as rapidly and efficiently as possible.

Table 3-6

Utilization Standards

Type Tree	Minimum d.b.h. ¹ (Inches)	Minimum Top d.i.b. ² (Inches)
First Decade		
Existing Mature Trees, Except Lodgepole Pine (first and future decades)	9	6
Existing Commercial Thinning Size Trees and Lodgepole Pine	7	4
Future Decades		
All Species, Except Surviving Stands of First Decade Existing Mature	7	4
¹ d.b.h.--diameter at breast height ² d.i.b.--diameter inside bark		

Standard and Guideline 6-3

In obtaining multiple-use resource objectives in forest management, the role and potential of fire as an integral part of the forest and rangeland environment will be considered.

1. Prescribed burning will be considered for use in meeting management objectives in areas where ecological studies show that fire has played a significant role in ecosystem development.
2. Prescribed burning will be utilized only when careful analysis indicates that it will be cost effective and practical. This analysis will include consideration of measures to mitigate impacts on air quality, such as increased removal of slash from the site, reduction of acres to be burned for hazard reduction, and ignition and burning techniques that reduce fuel consumption.
3. Maintenance of air quality will be a key factor in planning prescribed fire use. Consideration will be given to mitigation measures, such as burning during a longer season to spread emissions throughout the year, avoidance of burning near recreational units during times of peak use, and coordination with State smoke management plans.

Standard and Guideline 6-4

Prescribed burning on National Forest land in the Pacific Northwest Region should be planned to avoid or minimize smoke intrusion into sensitive areas that are defined in State smoke management plans.

Standard and Guideline 6-5

When burning is the selected treatment in areas where there is a high potential to adversely affect visual quality in designated Federal Class I areas or to adversely affect air quality in certain areas recognized as "sensitive," the best available impact predicting methods will be used.

Utility and Transportation Corridors

Standard and Guideline 7-1

Existing and potential utility and transportation corridors will be identified, and existing corridors will be designated as such, in Forest Plans. Corridor designation is not obligatory. Designation is appropriate for situations where existing or future occupancy by multiple rights-of-way are possible and desirable in order to meet corridor planning objectives.

1. Forests will inventory corridors according to standard definitions for utility corridors, existing utility corridors, new utility corridors, critical windows, exclusion areas, avoidance areas, and transportation corridors. (See Glossary.) All available data sources will be used in conducting this inventory.
2. Existing as well as potential utility and transportation rights-of-way will be examined in relation to issues and concerns and resource management objectives.
3. Residual capacity of designated corridors for existing utility and transportation rights-of-way will be identified.
4. Alternative off-Forest routes will be considered.
5. An environmental and economic analysis will be completed that identifies the trade-offs and costs and benefits of proposed locations.
6. Existing and new corridors will be examined to determine if there are other compatible resource uses for this land.
7. There are potential inter-Regional corridors. Affected Forests will coordinate the corridor designation process without regard for Regional boundaries. (Example: Winema and Fremont National Forests will consider designation of State Highway 299 E, the Pacific Gas and Electric's Pacific Northwest Inter-tie electric transmission line, and the potential Alaskan Canadian Natural Gas Transportation System in conjunction with the Shasta-Trinity and Modoc National Forests in Region 5.)

Standard and Guideline 7-2

Utility and transportation corridors will be planned and located to consolidate the commitment of land to these uses and to minimize ground and air disturbance.

Standard and Guideline 7-3

A Regional process will be used to determine where new corridors will be located according to the following criteria.

1. New proposals that cross multijurisdictional areas will be planned on an interagency basis.
2. Interagency and inter-Regional groups will cooperatively develop the process to be used for evaluating such new proposals.
3. Forest planners will apply this process in cooperation with the other involved agencies.

Northern Spotted Owl Habitat Management

Standard and Guideline 8-1

A. The northern spotted owl will be considered a management indicator species in Forest planning. Viable populations of northern spotted owls will be maintained to ensure their continued existence. A viable population is defined as one which has the estimated numbers and distribution of reproductive individuals to ensure its continued existence is well distributed in the planning area.

B. In order to ensure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals, and that habitat must be well distributed so that those individuals can interact with others in the planning area. Table 3-7 indicates the number of pairs of spotted owls assigned to the Region's Forests for testing in the Forest Plan analysis of the management situation.

Procedures used to determine the estimated minimum viable population for the Region are presented in Appendixes D and E. The figures used in Table 3-7 were developed based on information available in 1980. Application of the above direction concerning habitat to maintain a minimum viable population may result in changes in the actual number of pairs needed to maintain viable populations as individual Forests complete their analyses. Therefore, each Forest is directed to:

1. Analyze the effects of meeting those numbers of spotted owls listed in Table 3-7 and display the results on the maximum present net value benchmark that uses market plus assigned values under non-declining evenflow and culmination of the mean annual increment.
2. On those Forests where additional spotted owl habitat is discovered (beyond that habitat used in developing Table 3-7), include the additional spotted owls in the range of alternatives considered in developing the Forest Plan.

3. On Forests where no owl pairs were assigned in Table 3-7, but subsequent inventory has shown that owls exist, include a range of population levels (including the minimum number needed to ensure that the species is well distributed in the planning area) in Forest Plan alternatives.
4. On Forests where the habitat has been determined to be incapable of meeting the number assigned in Table 3-7, establish a new minimum population number through Forest planning.

C. The modeling procedures used to evaluate spotted owl management in Forest Plans must meet the following criteria:

1. The procedure must be silviculturally attainable.
2. The modeling procedure will be designed to ensure maintenance of viable populations of spotted owls, recognizing that some factors important in maintaining those populations are beyond the control of the Forest Service.
3. The modeling procedure will provide for proper distribution based on spatial definition of spotted owl habitat.
4. The modeling procedure will provide for meeting habitat needs within a SOMA (spotted owl management area) as defined in the proposed Spotted Owl Management Plan prepared by the Oregon-Washington Interagency Wildlife Committee (dated March 6, 1981), and the Region's Minimum Management Requirements dated February 9, 1983.

One of the following four methods will be used for modeling northern spotted owl habitats in Forest planning:

1. Designation of a management area in which no timber harvest is scheduled (i.e., "dedication")
2. Designation of a management area in which timber harvest is scheduled over extended rotations and silvicultural prescriptions are developed to meet and maintain habitat requirements
3. Designation of a management area in which the prescription provides for uneven-aged management that results in the maintenance of old-growth conditions meeting minimum management requirements
4. Appropriate combinations of the above, either applied in combination on each individual SOMA or by using different methods on different SOMA's

Forest Supervisors may use any of the above described procedures in modeling spotted owl habitat requirements. Testing the minimum management requirement for spotted owls should be done in accordance with direction for testing other minimum management requirements. Efficiency, measured in

Table 3-7

Spotted Owl Population Levels, in Pairs, To Be Tested in Forest Planning

National Forests	Forests' Share of Region's Minimum Viable Population
Oregon	
Deschutes	18
Mt. Hood	30
Rogue River	14
Siskiyou	31
Siuslaw	27
Umpqua	38
Willamette	98
Winema	7
SUBTOTAL	263
Washington	
Gifford Pinchot	32
Mt. Baker-Snoqualmie	49
Olympic	17
Wenatchee	14
SUBTOTAL	112
REGION TOTAL	375

terms of present net value and minimum impact on other resources, will be given primary consideration in selecting which of the four modeling procedures to use. FORPLAN may be the appropriate means for determining efficiency, by testing in benchmark analysis. Each Forest will display in the EIS an explanation of the rationale used in selecting a modeling procedure.

D. In addition, each Forest will analyze the effect of using a 300-acre habitat requirement (as contained in the original Oregon-Washington Inter-agency Wildlife Committee Spotted Owl Management Plan, 1979) on the maximum present net value benchmark that uses market plus assigned values nondeclining evenflow and culmination of mean annual increment. The results of this analysis will be displayed in the EIS.

Standard and Guideline 8-2

At least two Forest Plan alternatives specifically pertaining to spotted owl management will be formulated for evaluation. One of the alternatives will provide for the Forests' estimated share of the Region's minimum viable population, as calculated by the Forest based on the application of inventory data and habitat requirements. The other alternative will provide for 30 percent more than the estimated minimum population. Alternatives providing for other population levels should also be included where needed to meet multiple-use objectives. If possible, these alternatives should also meet assigned RPA outputs. Habitat characteristics currently considered necessary to support northern spotted owls are found in sections

1111 through 11141 of the 1981 Proposed Revision of the Oregon Interagency Spotted Owl Management Plan. (See Appendix F.)

Interim Direction

Until Forest Plans are approved, each National Forest with spotted owl populations will manage population numbers in compliance with interim direction given in Appendix C. Adjustments in the assigned population levels may be made as Forest inventory data are updated.

PLANNING GUIDANCE

Broad goals and planning direction for Forest Land and Resource Management Plans are provided in the Forest and Rangeland Renewable Resources Planning Act, the National Forest Management Act, and the 1980 RPA Assessment and Program. More specific direction for Forest planning is provided in this chapter by the Pacific Northwest Region's share of the 1980 RPA Program. In addition, specific planning guidance is provided for six Regional issues.

1980 RPA Program

Planning guidance also includes the Pacific Northwest Region's share of the 1980 RPA Program. Table 3-8 displays the share of National RPA Program outputs, activities, and estimated costs allocated to the Pacific Northwest Region. These targets and, most importantly, the trends over time reflect the Nation's resource management priorities, as determined in 1980 by Congress and the Administration (with extensive public participation).

The Region's RPA targets are further refined by distributing them among the 19 National Forests in the Region. Tables 3-9 through 3-27 display the outputs, activities, and costs for each National Forest in the Region. These distributions were based on existing management plans and direction and other available information used to develop the RPA program and subsequent budget proposals. Regional issues and concerns also were considered in the distribution of targets to the Forests.

Forests will consider a wide range of alternatives during the preparation of Forest Plans and are not to be limited by the RPA Program targets. However, each Forest is directed to formulate at least one Forest Plan alternative that meets or exceeds the RPA targets tentatively assigned to that Forest. The emphasis in Forest planning should be toward the future and how the inherent capabilities of the Forest can best be used to meet people's needs. The results of this analysis, in the form of Forest planning alternatives, will be incorporated into the Regional and national data bases and be used for development of the 1985 RPA update. The final National Program selected by Congress and the Administration, again with extensive public involvement, will then be distributed to the Regions and Forests. Thus, as discussed in Chapter 1, Forest planning is both continuous and iterative.

Some of the items listed on Tables 3-9 through 3-27 are program outputs, while others are either program inputs, intermediate outputs that serve as

inputs to the production of other outputs, or indicators of program effects. Decisions relative to Forest Plans will focus mainly on six major program outputs: developed recreation use, dispersed recreation use, wildlife habitat improvement, anadromous fish improvement, grazing use, and timber programmed sales offered (expressed in board feet). Forest targets expressed in cubic feet are shown in Appendix G.

Wildlife habitat improvement programs decline in later years because it was assumed that many of the cost-effective improvements would be accomplished by 1995 and that later work would maintain earlier improvements. Although wildlife habitat improvements persist for years, they do have finite lifetimes and must be replaced. Acre-equivalents are an estimate of the area directly affected or made usable for habitat as a result of habitat improvements. The area affected is often greater than the actual area treated. The improvements are expressed in acre-equivalents because a better measure has not been developed. If outputs could be shown in terms of wildlife populations or in days of hunting or other wildlife use, both measures would show increases to 2005 and would then level off until 2025. (Additional Planning Guidance follows RPA tables.)

Table 3-8

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Pacific Northwest Region**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	MM RVD's	13.5	13.6	13.6	14.0	15.1	15.5	15.9	16.0	18.2
Dispersed Rec. Use (Inc. Wild. and Fish)	MM RVD's	19.5	20.4	21.0	21.8	24.0	26.3	28.3	30.3	33.4
Trail Const./ Reconstruction	Miles	481	492	498	514	561	600	655	688	709
Wilderness										
Wilderness Mgt.	MM Acres	3.6	3.8	3.8	3.8	4.3	4.3	4.3	4.3	4.3
Wildlife and Fish										
Wildlife Hab. Improvement	MM Acres	214	159	147	133	121	103	83	52	51
Anadromous Fish Imp.	Thousand Pounds	0	10	39	1,090	1,050	2,160	2,880	2,880	2,880
Range										
Grazing Use (Livestock)	MM AUM's	0.732	0.739	0.746	0.752	0.755	0.779	0.813	0.782	0.880
Timber										
Programmed Sales Offered	MMBF	5,217	5,281	5,340	5,455	5,455	5,590	5,590	5,640	5,640
Reforestation	M Acres	147	144	141	137	126	128	131	141	141
Timber Stand Improvement	M Acres	123	120	119	118	104	107	108	110	112
Water										
Meeting Water Quality Goals	MM Acre- Feet	65.0	65.0	65.0	65.0	67.0	71.5	74.4	74.4	74.4
Minerals										
Leases and Permits	Operating Plans	5,865	6,390	7,010	7,550	9,000	10,000	11,000	12,250	12,750
Human and Commu- nity Develop.										
Human Resources Programs ¹	Enrollee Years	1,915	1,915	1,915	1,915	139	139	139	139	139
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,941	1,880	1,805	1,700	1,514	1,514	1,515	1,525	1,553
Fuelbreaks and Fuel Treatment	M Acres	28.2	37.7	38.0	38.6	39.5	29.5	29.4	29.4	29.4
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	6.3	6.3	6.3	6.3	2.6	0.2	0.2	0.2	0.2
Soils										
Soil and Water Resource Imp.	M Acres	9.8	9.8	9.8	10.0	10.1	6.8	3.7	3.7	3.7
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	70	82	100	115	118	134	155	155	155
Returns to Government	MM Dollars ²	495.3	499.5	507.9	508.7	520.5	560.0	602.0	647.4	694.0
Costs										
Operational	MM Dollars	135.7	138.8	143.4	147.4	218.0	248.6	239.0	242.8	247.1
Capital										
Investments	MM Dollars	361.9	367.1	372.0	384.7	310.5	319.3	327.5	332.5	339.2
Backlog	MM Dollars	17.4	16.7	14.7	11.8	1.6	1.6	0	0	0
Approp. Total ³	MM Dollars	497.6	505.9	515.4	532.1	528.5	567.9	566.5	575.3	586.3
Allocated Funds ⁴	MM Dollars	62.3	63.0	62.7	64.8	6.7	4.3	4.3	4.3	4.3
TOTAL Region	MM Dollars	559.9	568.9	578.1	596.9	535.2	572.2	570.8	579.6	590.0

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

³National Forest System Appropriated Funds include all Youth Conservation Corps and Cooperator Funds.

⁴National Forest System Allocated Funds include Young Adult Conservation Corps and other Human Resources Programs, O&C grants, land and water conservation funds, and other funds. Costs exclude payments to States and counties and Federal highway funds.

Table 3-9

**1980 RPA Annual Program Outputs, Activities, and Costs
for the Colville National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	283	283	283	287	300	300	300	300	300
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	489	509	522	535	580	620	660	680	730
Trail Const./ Reconstruction	Miles	0	0	0	0	1	3	7	9	10
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	9.654	7.173	6.632	6.000	5.459	4.647	3.744	2.346	2.300
Anadromous Fish Imp.	Pounds	0	0	0	0	0	0	0	0	0
Range										
Grazing Use (Livestock)	M AUM's	36	36	36	37	37	37	39	37	40
Timber										
Programmed Sales Offered	MMBF	103	107	113	119	125	181	191	225	225
Reforestation	M Acres	3.528	3.415	3.310	3.082	2.640	2.631	3.034	3.424	3.424
Timber Stand Improvement	M Acres	3.690	3.600	3.570	3.540	3.120	3.210	3.240	3.300	3.360
Water										
Meeting Water Quality Goals	MM Acre- Feet	1.032	1.032	1.032	1.032	1.068	1.140	1.188	1.188	1.188
Minerals										
Leases and Permits	Operating Plans	500	550	600	650	780	850	940	1,050	1,100
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	197	197	197	197	14	14	14	14	14
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,464	1,511	1,574	1,671	1,876	1,876	1,875	1,863	1,830
Fuelbreaks and Fuel Treatment	M Acres	854	854	854	854	854	854	854	854	854
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	1.4	1.6	2.4	3.3	3.4	4.6	5.7	5.7	5.7
Returns to Government	MM Dollars ²	4.6	4.7	5.6	6.0	6.6	14.9	18.7	22.0	27.6
Costs										
TOTAL Forest	MM Dollars	17.8	18.4	19.5	21.5	19.0	25.4	28.5	35.4	35.7

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-10

**1980 RPA Annual Program Outputs, Activities, and Costs
for the Deschutes National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	1,813	1,829	1,829	1,883	2,050	2,110	2,150	2,150	2,150
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	1,504	1,570	1,618	1,680	1,930	2,030	2,210	2,340	2,600
Trail Const./ Reconstruction	Miles	19	20	21	22	26	29	32	34	35
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	11.263	8.368	7.737	7.000	6.368	5.421	4.368	2.737	2.684
Anadromous Fish Imp.	Thousand Pounds	0	0	0	0	0	0	0	0	0
Range										
Grazing Use (Livestock)	M AUM's	29	29	31	32	32	36	40	38	45
Timber										
Programmed Sales Offered	MMBF	207	209	209	214	214	214	214	214	214
Reforestation	M Acres	8.411	8.370	8.285	8.143	7.975	8.101	8.100	8.224	8.224
Timber Stand Improvement	M Acres	8.610	8.400	8.330	8.260	7.280	7.490	7.560	7.700	7.840
Water										
Meeting Water Quality Goals	MM Acre- Feet	0.688	0.688	0.688	0.688	0.712	0.760	0.792	0.792	0.792
Minerals										
Leases and Permits	Operating Plans	1,250	1,360	1,485	1,585	1,900	2,130	2,320	2,360	2,400
Human and Commu- nity Develop.										
Human Resources Programs ¹	Enrollee Years	44	44	44	44	3	3	3	3	3
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,420	1,465	1,527	1,621	1,820	1,820	1,819	1,807	1,775
Fuelbreaks and Fuel Treatment	M Acres	1,995	1,995	1,995	1,995	1,995	1,995	1,995	1,995	1,995
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0.100	0.100	0.100	0.100	0.050	0.025	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.200	0.200	0.200	0.300	0.300	0.100	0.050	0.050	0.050
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.8	3.3	4.0	4.5	4.7	5.4	6.2	6.2	6.2
Returns to Government	MM Dollars ²	21.1	21.1	21.1	21.5	22.0	22.0	23.0	25.0	27.6
Costs										
TOTAL Forest	MM Dollars	21.3	21.3	21.5	22.5	19.7	20.8	20.2	20.6	20.6

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-11

**1980 RPA Annual Program Outputs, Activities, and Costs for the
Fremont National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	48	48	48	48	53	60	60	60	60
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	136	143	149	157	170	200	240	260	300
Trail Const./ Reconstruction	Miles	0	0	0	0	0	0	0	1	2
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	11.263	8.368	7.737	7.000	6.368	5.421	4.368	2.737	2.684
Anadromous Fish Imp.	Thousand Pounds	0	0	0	0	0	0	0	0	0
Range										
Grazing Use (Livestock)	M AUM's	68	70	70	70	70	72	74	72	75
Timber										
Programmed Sales Offered	MMEF	155	157	158	165	170	170	170	170	170
Reforestation	M Acres	6.722	6.590	6.310	6.000	6.000	6.230	6.330	7.000	7.000
Timber Stand Improvement	M Acres	6.150	6.000	5.950	5.900	5.200	5.350	5.400	5.500	5.600
Water										
Meeting Water Quality Goals	MM Acre- Feet	0.430	0.430	0.430	0.430	0.445	0.475	0.495	0.495	0.495
Minerals										
Leases and Permits	Operating Plans	125	135	145	160	190	200	200	200	200
Human and Commu- nity Develop. Human Resources Programs	Enrollee Years	33	33	33	33	2	2	2	2	2
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,249	1,289	1,343	1,425	1,600	1,600	1,599	1,589	1,560
Fuelbreaks and Fuel Treatment	M Acres	2,400	5,015	5,115	5,215	5,215	2,800	2,700	2,700	2,700
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.1	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.8	0.8	0.8	0.8	0.9	0.7	0.5	0.5	0.5
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.1	2.4	3.7	4.4	4.6	5.2	5.6	5.6	5.6
Returns to Government	MM Dollars ²	16.3	16.3	17.2	17.8	18.0	18.0	18.5	19.0	20.8
Costs										
TOTAL Forest	MM Dollars	17.1	17.3	17.4	18.2	16.9	17.4	17.3	17.6	17.8

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-12

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Gifford Pinchot National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	198	214	214	245	301	400	510	520	820
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	1,517	1,595	1,650	1,746	1,900	2,150	2,420	2,610	2,920
Trail Const./ Reconstruction	Miles	68	68	68	69	72	74	77	79	80
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	9.655	7.173	6.632	6.000	5.459	4.648	3.744	2.346	2.300
Anadromous Fish Imp. Improvement	Thousand Pounds	0	0.40	1.56	43.60	42.00	86.40	115.20	115.20	115.20
Range										
Grazing Use (Livestock)	M AUM's	2	2	3	3	3	4	6	4	8
Timber										
Programmed Sales Offered	MMBF	487	487	487	482	481	481	481	481	481
Reforestation	M Acres	14.394	14.250	14.060	13.797	12.650	12.630	12.900	13.500	12.500
Timber Stand Improvement	M Acres	6.150	6.000	5.950	5.900	5.200	5.350	5.400	5.519	5.600
Water										
Meeting Water Quality Goals	MM Acre- Feet	7.740	7.740	7.740	7.740	8.010	8.550	8.910	8.910	8.910
Minerals										
Leases and Permits	Operating Plans	250	275	300	325	390	430	490	570	650
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	109	109	109	109	8	8	8	8	8
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,864	1,923	2,004	2,127	2,389	2,389	2,387	2,371	2,329
Fuelbreaks and Fuel Treatment	M Acres	0	0	0	0	0	0	0	0	0
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.050	0	0	0.025	0.025
Soils										
Soil and Water Resource Imp.	M Acres	0.500	0.500	0.500	0.500	0.500	0.300	0.150	0.150	0.150
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	6.3	7.0	8.0	8.5	8.7	9.4	10.0	10.0	10.0
Returns to Government	MM Dollars ²	47.3	47.3	47.4	47.6	48.9	48.9	52.0	54.0	59.1
Costs										
TOTAL Forest	MM Dollars	40.0	40.0	40.0	39.5	35.5	37.5	36.3	37.1	37.4

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-13

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Malheur National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	97	99	99	104	117	120	130	130	150
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	173	185	194	205	230	280	340	390	470
Trail Const./ Reconstruction	Miles	0	0	0	0	1	3	7	9	10
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	19.308	14.346	13.263	12.000	10.918	9.283	7.489	4.692	4.602
Anadromous Fish Imp.	Thousand Pounds	0	0.70	2.73	76.30	73.50	151.20	201.60	201.60	201.60
Range										
Grazing Use (Livestock)	M AUM's	116	116	116	116	116	118	122	119	128
Timber										
Programmed Sales Offered	MMBF	202	210	220	230	241	276	279	279	279
Reforestation	M Acres	4.004	3.989	3.860	3.705	3.100	3.000	3.120	3.200	3.200
Timber Stand Improvement	M Acres	4.920	4.800	4.760	4.720	4.160	4.280	4.320	4.400	4.480
Water										
Meeting Water Quality Goals	MM Acre- Feet	1.290	1.290	1.290	1.290	1.335	1.425	1.485	1.485	1.485
Minerals										
Leases and Permits	Operating Plans	50	60	70	80	90	100	110	140	150
Human and Commu- nity Develop.										
Human Resources Programs ¹	Enrollee Years	34	34	34	34	3	3	3	3	3
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,353	1,396	1,454	1,544	1,734	1,734	1,732	1,721	1,690
Fuelbreaks and Fuel Treatment	M Acres	3,897	6,597	6,697	6,897	6,897	4,097	4,097	4,097	4,097
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.8	3.3	4.0	5.8	5.8	7.4	8.2	8.2	8.2
Returns to Government	MM Dollars ²	16.1	16.6	17.4	18.0	19.0	23.0	26.0	30.0	34.2
Costs										
TOTAL Forest	MM Dollars	22.1	22.9	24.0	26.1	25.5	27.2	28.0	28.6	28.7

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-14

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Mt. Baker-Snoqualmie National Forest**

Program Element Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	2,139	2,151	2,151	2,205	2,381	2,390	2,400	2,420	2,660
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	2,408	2,516	2,586	2,670	2,910	3,180	3,420	3,590	3,930
Trail Const./ Reconstruction	Miles	61	62	62	63	66	69	72	74	75
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	12.872	9,565	8.842	8.000	7.278	6.195	4.991	3.128	3.068
Anadromous Fish Imp.	Thousands Pounds	0	1.0	3.9	109.0	105.0	216.0	288.0	288.0	288.0
Range										
Grazing Use (Livestock)	M AUM's	1	1	1	1	1	2	2	2	3
Timber										
Programmed Sales Offered	MMBF	288	296	301	314	322	338	338	343	343
Reforestation	M Acres	6.839	6.440	6.310	6.000	5.200	5.340	5.300	5.700	5.700
Timber Stand Improvement	M Acres	6.150	6.000	5.950	5.900	5.200	5.350	5.400	5.500	5.600
Water										
Meeting Water Quality Goals	MM Acres- Feet	14.088	14.088	14.088	14.088	14.310	15.260	15.792	15.792	15.792
Minerals										
Leases and Permits	Operating Plans	375	410	450	480	575	640	690	730	750
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	178	178	178	178	13	13	13	13	13
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,379	1,422	1,482	1,573	1,767	1,767	1,765	1,754	1,723
Fuelbreaks and Fuel Treatment	M Acres	534	534	534	534	534	534	534	534	534
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.500	0.025	0.050	0.050	0.050
Soils										
Soil and Water Resource Imp.	M Acres	0.500	0.500	0.500	0.500	0.500	0.300	0.100	0.100	0.100
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	4.3	5.1	6.6	7.9	8.1	10.3	12.3	12.3	12.3
Returns to Government	MM Dollars ²	27.2	27.6	27.7	28.0	28.7	30.7	33.0	37.0	42.1
Costs										
TOTAL Forest	MM Dollars	37.8	38.9	39.6	42.2	38.9	41.9	40.7	42.2	43.5

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-15

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Mt. Hood National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	1,555	1,565	1,565	1,612	1,749	1,780	1,800	1,830	2,060
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	2,383	2,499	2,573	2,670	2,940	3,290	3,600	3,860	4,290
Trail Const./ Reconstruction	Miles	41	42	42	43	46	49	52	54	55
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	8.045	5.977	5.526	5.000	4.549	3.872	3.120	1.954	1.917
Anadromous Fish Imp. Improvement	Thousand Pounds	0	1.0	3.9	109.0	105.0	216.0	288.0	288.0	288.0
Range										
Grazing Use (Livestock)	M AUM's	8	8	8	9	10	12	14	12	19
Timber										
Programmed Sales Offered	MMBF	422	418	418	418	376	376	376	376	376
Reforestation	M Acres	11.303	11.040	10.810	10.392	9.500	9.590	9.700	10.001	10.001
Timber Stand Improvement	M Acres	2.460	2.400	2.380	2.360	2.080	2.140	2.160	2.200	2.240
Water										
Meeting Water Quality Goals	MM Acre- Feet	6.880	6.880	6.880	6.880	7.120	7.600	7.920	7.920	7.920
Minerals										
Leases and Permits	Operating Plans	190	210	230	245	290	340	420	540	600
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	278	278	278	278	20	20	20	20	20
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	2,676	2,761	2,877	3,054	3,430	3,430	3,427	3,405	3,344
Fuelbreaks and Fuel Treatment	M Acres	737	1,237	1,237	1,237	1,237	837	837	837	837
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.300	0.025	0.050	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.30	0.30	0.30	0.30	0.30	0.10	0.05	0.05	0.05
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	5.6	6.5	7.2	7.9	6.9	6.9	6.9	6.9	6.9
Returns to Government	MM Dollars ²	29.8	29.4	29.5	30.0	31.8	33.3	36.0	42.0	46.2
Costs										
TOTAL Forest	MM Dollars	40.0	39.6	39.6	39.6	32.7	34.9	34.6	34.2	35.6

¹ Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

² All costs and returns are shown in constant 1978 dollars.

Table 3-16

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Ochoco National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	285	286	286	292	315	320	320	320	340
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	285	296	303	314	340	360	380	400	430
Trail Const./ Reconstruction	Miles	0	0	0	0	0	2	3	4	5
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	16.091	11.955	11.053	10.000	9.098	7.744	6.242	3.910	3.835
Anadromous Fish Imp.	Thousand Pounds	0	0	0	0	0	0	0	0	0
Range										
Grazing Use (Livestock)	M AUM's	79	80	80	80	80	82	83	83	86
Timber										
Programmed Sales Offered	MMBF	137	140	140	146	150	150	150	150	150
Reforestation	M Acres	1.361	1.290	1.260	1.050	1.060	1.120	1.310	1.400	1.400
Timber Stand Improvement	M Acres	4.920	4.800	4.760	4.720	4.160	4.280	4.320	4.400	4.480
Water										
Meeting Water Quality Goals	MM Acre- Feet	0.258	0.258	0.258	0.258	0.267	0.285	0.297	0.297	0.297
Minerals										
Leases and Permits	Operating Plans	380	400	440	480	575	650	660	660	660
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	39	39	39	39	5	5	5	5	5
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,795	1,852	1,930	2,048	2,300	2,300	2,298	2,283	2,243
Fuelbreaks and Fuel Treatment	M Acres	5,400	8,242	8,342	8,442	8,442	5,600	5,600	5,600	5,600
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.9	0.9	0.9	0.9	0.9	0.7	0.3	0.3	0.3
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.0	2.4	3.1	3.5	4.0	5.0	5.6	5.6	5.6
Returns to Government	MM Dollars ²	16.2	16.5	16.6	17.0	17.3	17.3	17.5	18.0	18.5
Costs										
TOTAL Forest	MM Dollars	17.4	17.4	17.8	17.8	16.6	18.0	18.5	17.9	18.6

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-17

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Okanogan National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	353	353	353	359	360	360	360	360	360
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	562	580	592	607	640	660	660	660	670
Trail Const./ Reconstruction	Miles	57	58	59	61	65	67	70	73	75
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	12.872	9.565	8.842	8.000	7.278	6.195	4.992	3.128	3.068
Anadromous Fish Imp.	Thousands Pounds	0	0.300	1.170	32.700	31.500	64.800	86.400	86.400	86.400
Range										
Grazing Use (Livestock)	M AUM's	58	59	60	60	60	63	63	63	66
Timber										
Programmed Sales Offered	MMBF	82	83	86	94	104	104	104	104	104
Reforestation	M Acres	2.167	2.090	1.960	1.912	1.600	1.570	1.100	1.900	1.900
Timber Stand Improvement	M Acres	2.460	2.400	2.380	2.360	2.080	2.140	2.160	2.200	2.240
Water										
Meeting Water Quality Goals	MM Acre- Feet	1.376	1.376	1.376	1.376	1.424	1.520	1.584	1.584	1.584
Minerals										
Leases and Permits	Operating Plans	250	270	300	325	390	430	490	560	600
Human and Commu- nity Develop.										
Human Resources Programs ¹	Enrollee Years	52	52	52	52	4	4	4	4	4
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,013	1,045	1,089	1,156	1,298	1,298	1,297	1,288	1,265
Fuelbreaks and Fuel Treatment	M Acres	1,200	1,367	1,367	1,567	1,567	1,200	1,200	1,200	1,200
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.100	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.200	0.200	0.200	0.300	0.300	0.200	0.100	0.100	0.100
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	1.2	1.6	1.6	2.3	2.4	2.7	3.1	3.1	3.1
Returns to Government	MM Dollars ²	4.7	4.7	4.8	5.2	6.9	8.0	9.5	11.9	12.7
Costs										
TOTAL Forest	MM Dollars	10.4	10.5	10.9	11.9	11.2	12.7	13.0	12.3	12.5

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-18

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Olympic National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	408	408	408	413	420	420	430	430	450
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	910	948	973	1,006	1,090	1,180	1,240	1,280	1,370
Trail Const./ Reconstruction	Miles	0	0	0	0	1	3	4	5	6
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	4.827	3.586	3.316	3.000	2.729	2.323	1.872	1.173	1.150
Anadromous Fish Imp.	Thousand Pounds	0	0.90	3.51	98.10	94.50	194.40	259.20	259.20	259.20
Range										
Grazing Use (Livestock)	M AUM's	0	0	0	0	0	0	0	0	0
Timber										
Programmed Sales Offered	MMBF	371	371	371	371	360	349	343	343	343
Reforestation	M Acres	12.184	11.999	11.960	11.800	11.105	11.300	12.030	13.000	13.000
Timber Stand Improvement	M Acres	6.150	6.000	5.950	5.900	5.200	5.350	5.400	5.500	5.600
Water										
Meeting Water Quality Goals	MM Acre- Feet	5.160	5.160	5.160	5.160	5.340	5.700	5.940	5.940	5.940
Minerals										
Leases and Permits	Operating Plans	100	110	120	130	160	170	200	240	250
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	82	82	82	82	6	6	6	6	6
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	2,562	2,644	2,755	2,924	3,284	3,284	3,281	3,260	3,202
Fuelbreaks and Fuel Treatment	M Acres	454	954	954	954	954	454	454	454	454
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.40	0.40	0.40	0.40	0.40	0.30	0.15	0.15	0.15
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	4.9	5.2	5.6	5.3	5.3	5.3	5.3	5.3	5.3
Returns to Government	MM Dollars ²	20.5	20.3	20.4	21.0	22.4	25.0	30.0	30.0	30.0
Costs										
TOTAL Forest	MM Dollars	27.7	27.7	27.7	27.7	24.7	24.8	24.5	24.0	24.3

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-19

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Rogue River National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	466	467	467	478	516	520	520	520	570
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	436	454	466	482	520	560	600	620	670
Trail Const./ Reconstruction	Miles	6	7	8	10	14	17	21	23	25
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	6.436	4.782	4.421	4.000	3.639	3.098	2.496	1.564	1.534
Anadromous Fish Imp.	Thousand Pounds	0	0.200	0.780	21.800	21.000	43.200	57.600	57.600	57.600
Range										
Grazing Use (Livestock)	M AUM's	21	21	22	22	22	22	24	22	26
Timber										
Programmed Sales Offered	MMBF	216	216	216	216	206	206	198	198	198
Reforestation	M Acres	7.217	7.090	6.960	6.800	6.700	6.370	6.500	7.210	7.210
Timber Stand Improvement	M Acres	7.380	7.200	7.140	7.080	6.240	6.420	6.480	6.600	6.720
Water										
Meeting Water Quality Goals	MM Acre- Feet	1.806	1.806	1.806	1.806	1.869	1.995	2.079	2.079	2.079
Minerals										
Leases and Permits	Operating Plans	310	340	370	400	475	530	580	640	650
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	44	44	44	44	3	3	3	3	3
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	2,700	2,786	2,903	3,081	3,460	3,460	3,457	3,435	3,373
Fuelbreaks and Fuel Treatment	M Acres	651	751	751	751	751	651	651	651	651
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.05	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.30	0.30	0.30	0.30	0.30	0.10	0.05	0.05	0.05
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.8	3.3	4.0	4.6	4.5	4.1	4.1	4.1	4.1
Returns to Government	MM Dollars ²	24.4	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3
Costs										
TOTAL Forest	MM Dollars	26.0	26.0	26.0	26.0	22.7	23.6	23.4	22.3	21.9

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-20

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Siskiyou National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	116	116	116	118	120	120	120	120	120
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	599	625	642	664	720	780	830	900	940
Trail Const./ Reconstruction	Miles	3	4	5	7	11	13	17	19	20
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	8.045	5.977	5.526	5.000	4.549	3.872	3.120	1.954	1.917
Anadromous Fish Imp.	Thousand Pounds	0	1.10	4.29	119.90	115.50	237.60	316.80	316.80	316.80
Range										
Grazing Use (Livestock)	M AUM's	3	3	3	3	3	4	6	4	10
Timber										
Programmed Sales Offered	MMBF	203	203	203	203	200	200	200	200	200
Reforestation	M Acres	8.322	8.240	8.160	8.000	7.776	7.941	8.161	8.224	8.224
Timber Stand Improvement	M Acres	13.530	13.200	13.090	12.980	11.440	11.700	11.880	12.100	12.230
Water										
Meeting Water Quality Goals	MM Acre- Feet	2.752	2.752	2.752	2.752	2.848	3.040	3.168	3.168	3.168
Minerals										
Leases and Permits	Operating Plans	250	280	310	325	380	425	470	500	500
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	44	44	44	44	3	3	3	3	3
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,979	2,042	2,127	2,258	2,536	2,536	2,534	2,517	2,472
Fuelbreaks and Fuel Treatment	M Acres	150	250	250	250	250	150	150	150	150
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0.05	0.05	0.05	0.05	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.50	0.50	0.50	0.50	0.50	0.30	0.10	0.10	0.10
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.8	3.3	4.0	4.3	3.5	3.2	3.2	3.2	3.2
Returns to Government	MM Dollars ²	27.5	27.4	26.0	25.5	25.0	25.0	25.0	25.0	24.6
Costs										
TOTAL Forest	MM Dollars	29.6	29.6	29.6	29.6	26.2	27.2	26.8	27.4	26.9

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-21

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Siuslaw National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	960	960	960	974	1,000	1,000	1,000	1,000	1,000
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	706	731	746	767	820	850	870	880	890
Trail Const./ Reconstruction	Miles	0	0	0	0	0	0	0	0	1
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	6.436	4.782	4.421	4.000	3.639	3.098	2.496	1.564	1.534
Anadromous Fish Imp.	Thousand Pounds	0	1.40	5.46	152.60	147.00	302.40	403.20	403.20	403.20
Range										
Grazing Use (Livestock)	M AUM's	2	2	2	3	3	3	5	3	8
Timber										
Programmed Sales Offered	MMBF	406	415	424	437	440	444	444	446	446
Reforestation	M Acres	9.839	9.540	9.305	9.150	8.550	8.800	9.100	9.840	9.840
Timber Stand Improvement	M Acres	15.990	15.600	15.470	15.340	13.520	13.910	14.040	14.300	14.560
Water										
Meeting Water Quality Goals	MM Acre- Feet	3.010	3.010	3.010	3.010	3.115	3.325	3.465	3.465	3.465
Minerals										
Leases and Permits	Operating Plans	560	610	660	720	860	950	1,080	1,270	1,300
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	195	195	195	195	14	14	14	14	14
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	2,936	3,029	3,156	3,350	3,762	3,762	3,759	3,735	3,668
Fuelbreaks and Fuel Treatment	M Acres	0	0	0	0	0	0	0	0	0
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0.100	0.100	0.100	0.500	0.100	0.075	0.050	0.050
Soils										
Soil and Water Resource Imp.	M Acres	0.300	0.300	0.300	0.300	0.300	0.100	0.050	0.050	0.050
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	5.4	7.0	8.6	10.0	10.4	11.7	13.4	13.4	13.4
Returns to Government	MM Dollars ²	50.7	51.7	51.9	52.0	52.3	52.3	53.0	53.5	54.8
Costs										
TOTAL Forest	MM Dollars	36.1	36.9	37.7	39.9	35.1	37.2	37.4	37.2	37.5

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-22

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Umatilla National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	259	259	259	260	260	260	260	260	260
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	1,293	1,384	1,384	1,431	1,670	1,690	1,790	1,850	2,020
Trail Const./ Reconstruction	Miles	21	22	23	25	29	32	37	39	40
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	16.091	11.955	11.053	10.000	9.098	7.744	6.241	3.910	3.835
Anadromous Fish Imp.	Thousand Pounds	0	0.70	2.73	76.30	73.50	151.20	201.60	201.60	201.60
Range										
Grazing Use (Livestock)	M AUM's	55	55	55	55	55	57	60	57	63
Timber										
Programmed Sales Offered	MMBF	179	183	185	200	205	205	205	205	205
Reforestation	M Acres	5.505	5.445	5.430	5.359	4.715	5.040	5.300	5.900	5.900
Timber Stand Improvement	M Acres	1.230	1.200	1.190	1.180	1.040	1.070	1.080	1.091	1.120
Water										
Meeting Water Quality Goals	MM Acre- Feet	1.290	1.290	1.290	1.290	1.335	1.425	1.485	1.485	1.485
Minerals										
Leases and Permits	Operating Plans	250	270	300	320	380	400	400	400	400
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	32	32	32	32	2	2	2	2	2
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,419	1,464	1,525	1,619	1,818	1,818	1,816	1,805	1,773
Fuelbreaks and Fuel Treatment	M Acres	2,237	2,237	2,237	2,237	2,237	2,237	2,237	2,237	2,237
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.5	0.5	0.5	0.5	0.5	0.4	0.2	0.2	0.2
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.1	2.4	3.5	3.5	3.5	4.2	5.7	5.7	5.7
Returns to Government	MM Dollars ²	10.8	10.9	11.0	11.0	11.0	14.0	19.0	22.7	25.2
Costs										
TOTAL Forest	MM Dollars	16.3	16.7	16.8	18.2	16.5	17.6	18.1	17.4	18.1

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-23

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Umpqua National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	817	842	842	901	1,026	1,170	1,330	1,340	1,860
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	392	421	442	470	540	670	810	930	1,090
Trail Const./ Reconstruction	Miles	4	5	6	7	11	13	17	19	20
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	6.436	4.782	4.421	4.000	3.639	3.098	2.496	1.564	1.534
Anadromous Fish Imp.	Thousands Pounds	0	0.80	3.12	87.20	84.00	172.80	230.40	230.40	230.40
Range										
Grazing Use (Livestock)	M AUM's	10	10	10	10	11	12	15	12	22
Timber										
Programmed Sales Offered	MMBF	393	406	415	423	427	427	427	436	436
Reforestation	M Acres	10,561	10,340	10,200	9,924	9,270	8,800	9,110	9,820	9,820
Timber Stand Improvement	M Acres	8.610	8.400	8.330	8.260	7.280	7.490	7.560	7.700	7.840
Water										
Meeting Water Quality Goals	MM Acre- Feet	2.752	2.752	2.752	2.752	2.848	3.040	3.168	3.168	3.168
Minerals										
Leases and Permits	Operating Plans	150	165	180	190	230	255	280	310	320
Human and Commu- nity Develop.										
Human Resources Programs ¹	Enrollee Years	211	211	211	211	15	15	15	15	15
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	2,158	2,226	2,319	2,462	2,765	2,765	2,762	2,745	2,696
Fuelbreaks and Fuel Treatment	M Acres	353	453	453	453	453	453	453	453	453
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.30	0.30	0.30	0.30	0.30	0.10	0.05	0.05	0.05
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	5.3	6.3	8.0	9.8	10.0	12.2	15.4	15.4	15.4
Returns to Government	MM Dollars ²	45.1	46.5	46.5	46.5	47.0	51.0	52.0	52.5	53.5
Costs										
TOTAL Forest	MM Dollars	34.2	35.3	36.1	37.8	33.2	35.2	35.2	35.2	36.0

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-24

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Wallowa-Whitman National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	370	370	370	378	407	410	410	410	430
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	1,002	1,042	1,066	1,101	1,180	1,260	1,310	1,350	1,450
Trail Const./ Reconstruction	Miles	64	65	65	66	70	73	77	79	80
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	19.308	14.346	13.263	12.000	10.917	9.293	7.489	4.692	4.602
Anadromous Fish Imp.	Thousand Pounds	0	0.50	1.95	54.50	52.50	108.00	144.00	144.00	144.00
Range										
Grazing Use (Livestock)	M AUM's	201	204	206	206	206	208	208	208	220
Timber										
Programmed Sales Offered	HMBF	214	215	217	220	220	220	220	220	220
Reforestation	M Acres	4.872	4.640	4.360	4.050	3.200	3.670	3.700	4.500	4.500
Timber Stand Improvement	M Acres	4.920	4.800	4.760	4.720	4.160	4.280	4.320	4.400	4.480
Water										
Meeting Water Quality Goals	MM Acre- Feet	2.580	2.580	2.580	2.580	2.670	2.850	2.970	2.970	2.970
Minerals										
Leases and Permits	Operating Plans	250	270	300	320	380	425	470	500	500
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	55	55	55	55	4	4	4	4	4
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,040	1,073	1,019	1,081	1,214	1,214	1,213	1,205	1,184
Fuelbreaks and Fuel Treatment	M Acres	2,838	2,838	2,838	2,838	2,838	2,838	2,838	2,838	2,838
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	3.00	0.40	0	0	0.05	0.05
Soils										
Soil and Water Resource Imp.	M Acres	1.00	1.00	1.00	1.00	1.00	0.90	0.60	0.60	0.60
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.8	3.3	4.0	4.6	4.7	5.4	7.2	7.2	7.2
Returns to Government	MM Dollars ²	8.1	8.0	9.0	9.0	10.0	13.0	18.0	24.0	27.1
Costs										
TOTAL Forest	MM Dollars	27.2	27.3	27.6	28.0	25.1	26.3	26.0	26.0	26.8

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-25

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Wenatchee National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	1,437	1,445	1,445	1,490	1,616	1,640	1,670	1,690	1,910
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	3,009	3,137	3,274	3,410	3,780	4,310	4,530	5,200	5,890
Trail Const./ Reconstruction	Miles	91	92	92	93	96	98	101	103	104
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	14.481	10.759	9.947	9.000	8.188	6.970	5.618	3.519	3.451
Anadromous Fish Imp.	Thousand Pounds	0	0.60	2.34	65.40	63.00	129.60	172.80	172.80	172.80
Range										
Grazing Use (Livestock)	M AUM's	20	20	20	21	22	23	25	23	30
Timber										
Programmed Sales Offered	MMBF	196	198	200	210	210	210	210	210	210
Reforestation	M Acres	6.378	6.090	5.800	5.427	4.780	5.340	5.300	5.720	5.720
Timber Stand Improvement	M Acres	2.460	2.400	2.380	2.360	2.080	2.140	2.160	2.200	2.240
Water										
Meeting Water Quality Goals	MM Acre- Feet	3.870	3.870	3.870	3.870	4.005	4.275	4.455	4.455	4.455
Minerals										
Leases and Permits	Operating Plans	200	220	240	260	300	340	400	600	670
Human and Commu- nity Develop.										
Human Resources Programs	Enrollee Years	103	103	103	103	7	7	7	7	7
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,346	1,389	1,447	1,536	1,725	1,725	1,723	1,712	1,682
Fuelbreaks and Fuel Treatment	M Acres	900	900	900	900	1,600	1,000	1,000	1,000	1,000
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	6.30	6.05	6.05	3.05	0.30	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.60	0.60	0.60	0.60	0.60	0.50	0.30	0.30	0.30
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.8	3.2	3.7	4.4	4.5	5.4	7.2	7.2	7.2
Returns to Government	MM Dollars ²	6.6	6.6	7.0	7.0	8.0	12.0	17.0	23.0	25.7
Costs										
TOTAL Forest	MM Dollars	21.1	21.3	21.5	22.6	20.2	21.5	21.8	21.2	21.8

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

Table 3-26

**1980 RPA Annual Program Outputs, Activities, and Costs for
the Willamette National Forest**

Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	1,412	1,420	1,420	1,457	1,575	1,580	1,590	1,600	1,780
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	1,431	1,496	1,538	1,585	1,730	1,900	2,050	2,150	2,370
Trail Const./ Reconstruction	Miles	46	47	47	48	51	54	57	59	60
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	14.481	10.759	9.947	9.000	8.188	6.970	5.618	3.519	3.451
Anadromous Fish Imp.	Thousand Pounds	0	0.40	1.56	43.60	42.00	86.40	115.20	115.20	115.20
Range										
Grazing Use (Livestock)	M AUM's	1	1	1	2	2	2	3	2	5
Timber										
Programmed Sales Offered	MMBF	792	802	812	823	834	869	870	870	870
Reforestation	M Acres	17.154	16.990	16.800	16.675	15.729	15.200	15.500	16.920	16.290
Timber Stand Improvement	M Acres	11.070	10.800	10.710	10.620	9.360	9.630	9.720	9.900	10.080
Water										
Meeting Water Quality Goals	MM Acre- Feet	7.740	7.740	7.740	7.740	8.012	8.550	8.910	8.910	8.910
Minerals										
Leases and Permits	Operating Plans	375	400	450	485	575	650	710	850	900
Human and Commu- nity Develop. Human Resources Programs	Enrollee Years	115	115	115	115	8	8	8	8	8
Protection										
Fire Mgt. Ef- fectiveness	Dollars per M Acres	1,553	1,602	1,670	1,772	1,990	1,990	1,988	1,976	1,940
Fuelbreaks and Fuel Treatment	M Acres	1,635	1,635	1,635	1,635	1,735	1,635	1,635	1,635	1,635
Lands										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.05	0	0	0	0
Soils										
Soil and Water Resource Imp.	M Acres	0.80	0.80	0.80	0.80	0.80	0.50	0.25	0.25	0.25
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	10.5	12.3	15.0	17.7	19.5	21.6	25.3	25.3	25.3
Returns to Government	MM Dollars ²	100.3	101.6	101.9	102.0	102.3	108.3	110.0	114.0	119.1
Costs										
TOTAL Forest	MM Dollars	62.5	63.2	64.0	65.9	62.8	65.5	65.1	66.3	68.2

¹Human Resources Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

²All costs and returns are shown in constant 1978 dollars.

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Program Element and Activity	Unit of Measure	Annual Units								
		1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Recreation										
Developed Rec. Use (Inc. VIS)	M RVD's	484	485	485	496	534	540	540	540	570
Dispersed Rec. Use (Inc. Wild. and Fish)	M RVD's	265	275	282	290	310	330	340	350	370
Trail Const./ Reconstruction	Miles	0	0	0	0	1	3	4	5	6
Wildlife and Fish										
Wildlife Hab. Improvement	M Acres	6.436	4.782	4.421	4.000	3.639	3.098	2.496	1.564	1.534
Anadromous Fish Imp.	Thousand Pounds	0	0	0	0	0	0	0	0	0
Range										
Grazing Use (Livestock)	M AUM's	22	22	22	22	22	22	22	24	26
Timber										
Programmed Sales Offered	MMBF	164	165	165	170	170	170	170	170	170
Reforestation	M Acres	6.233	6.152	5.860	5.734	4.950	5.320	5.405	5.720	5.720
Timber Stand Improvement	M Acres	6.150	6.000	5.950	5.900	5.200	5.350	5.400	5.500	5.600
Water										
Meeting Water Quality Goals	MM Acre-Feet	0.258	0.258	0.258	0.258	0.267	0.285	0.297	0.297	0.297
Minerals										
Leases and Permits	Operating Plans	50	55	60	70	80	85	90	130	150
Human and Community Develop.										
Human Resources Programs	Enrollee Years	45	45	45	45	3	3	3	3	3
Protection										
Fire Mgt. Effectiveness	Dollars per M Acres	1,654	1,707	1,778	1,887	2,120	2,120	2,118	2,104	2,067
Fuelbreaks and Fuel Treatment	M Acres	1,917	1,917	1,917	1,917	2,017	1,917	1,917	1,917	1,917
Land										
Land Purchase and Acquisition (Excl. Exchange)	M Acres	0	0	0	0	0.100	0	0	0.025	0.025
Soils										
Soil and Water Resource Imp.	M Acres	0.400	0.400	0.400	0.400	0.400	0.200	0.100	0.100	0.100
Facilities										
Road Con./Recon. (Arterial, Collector)	Miles	2.1	2.4	3.0	3.4	3.5	4.0	4.6	4.6	4.6
Returns to Government	MM Dollars ²	18.0	18.0	18.4	18.5	19.0	19.0	19.5	19.5	20.9
Costs										
TOTAL Forest	MM Dollars	13.4	13.5	13.5	13.8	12.4	13.5	13.7	13.7	13.7

²All costs and returns are shown in constant 1978 dollars.

²All costs and returns are shown in constant 1978 dollars.

Additional Planning Guidance

Many of the issues and concerns identified in the Regional planning process (and discussed in Chapter 2) can be addressed during the development of individual Forest Plans using existing management direction. Therefore, additional planning guidance is provided only for the following issues:

1. Outdoor recreation
2. Conflicts between timber and range management and wildlife habitat objectives
3. Energy
4. Old-growth timber
5. American Indian rights and interests
6. Integrated Pest Management

(See Appendix B of the EIS.)

Outdoor Recreation

The basic issue pertaining to outdoor recreation is how the Forest Service can manage National Forest recreation resources to meet increasing demands for outdoor recreation and to minimize conflicts between various public and user groups. This issue has three aspects:

1. How the Forest Service should recognize and manage National Forest visual resources to provide a pleasing experience for forest visitors
2. How the Forest Service can address an anticipated future supply shortage of primitive recreation experience areas in the Pacific Northwest Region
3. How a balance of use can be achieved that will consider user conflict, user regulation, and needed facilities

Eight of the Region's National Forests will be key to meeting anticipated demand for recreation over the next 50 years. If these eight National Forests provide primitive and semiprimitive nonmotorized recreation for 16 percent of their recreation visitor days, the Regional demand for these recreation experiences will be met. However, if the eight Forests provide primitive and semiprimitive nonmotorized uses for only 12 percent of their recreation visitor days, then an additional 1.4 million RVD's would need to be provided from other National Forests to meet expected demand.

Planning Guidance.

1. Forest Plans will deal with identification and analysis of the visual resources through guidance provided in Forest Service Manual

chapter 1920 (specifically, FSM 1922.35b). Other references for planning National Forest visual resources include Chapter 2380 of the Forest Service Manual and Agricultural Handbooks 462 and 559.

2. Forest Plans will follow instructions in FSM 1922.32a and in the Final Environmental Statement for the second Roadless Area Review and Evaluation for all areas included in the RARE II process. Management decisions for areas designated for further planning will be included in Forest Plans.
3. Forest Plans will deal with identification and analysis of the recreation resource through guidance provided in FSM 1922.35a.
4. In at least one Forest planning alternative, the following National Forests will look for opportunities to provide, and will examine the effects of providing, a primitive or semiprimitive nonmotorized recreation experience for 12 to 16 percent of their total anticipated recreation demand: Deschutes, Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan, Rogue River, Wenatchee, and Willamette. These opportunities can be provided by any combination of existing wilderness, scenic areas, presently undeveloped areas, or any other area that meets the criteria outlined in the recreation opportunity spectrum.
5. National Forests should review the "Recommended Renewable Resources Program (FS-346)," September 1980 update (pages 34-37), for background information about recreation use management on National Forests during the forthcoming planning period.

By aggregating various Forest Plan alternatives, this issue can be analyzed and addressed on a Regional basis in the next planning cycle.

Conflicts Between Timber and Range Management and Wildlife Habitat Objectives

The total number of livestock grazing on the National Forests in the Pacific Northwest Region has remained relatively constant through the past 10 years. During the same period, elk populations have increased. Timber harvest, which results in increased carrying capacity for elk (and livestock) on summer ranges, has been a contributing factor to the elk increase. In some locations, however, the level and patterns of timber harvest have reached, and perhaps exceeded, the level at which elk habitat is improved, and the habitat may be adversely affected.

At present, use of the range by both livestock and elk is causing damage to vegetation in some areas, particularly on winter ranges. This situation is most apparent in northeastern Oregon.

The Oregon Department of Fish and Wildlife personnel have developed recommended population levels for which elk herds should be managed. Members of the livestock industry have expressed concern that some of these numbers are too high. On the other hand, the hunting community supports more elk. The Oregon Fish and Wildlife Commission has established an official position on recommended elk herd management levels.

Planning Guidance. Forest Plan alternatives will discuss the impacts of timber, range, and wildlife habitat levels on each other and list mitigation measures that are contemplated. Various Forest Plan alternatives and effects can be aggregated on a Regional basis for the next cycle of planning in order to examine the Regional aspects of this issue.

Energy

Energy production from National Forests is emerging as an issue because of the worldwide search that is under way for future energy sources. Consideration needs to be given to how the National Forests in the Pacific Northwest Region should be managed for production of energy. Examination of this issue should include the following:

1. How National Forest wood fiber should be considered in future energy resource planning
2. How National Forests should plan for exploration and development of energy minerals, such as coal, uranium, petroleum, and natural gas, within the Forests' boundaries
3. How National Forests should plan for development of hydroelectric facilities, including pumped storage sites
4. How National Forests should plan for potential site development for wind and solar energy production
5. How National Forests should plan for exploration and development of geothermal resources
6. How National Forests should plan for energy transmission facilities through the Forests

Planning Guidance

1. Wood Fiber--Forest Plans will support the 1980 RPA National Program for research designed to increase knowledge about biomass for energy, recognizing a possible role in future Forest Plans.
2. Energy Minerals--Forest Plans will assess the known potential for developing energy mineral resources, including coal, uranium, petroleum, and natural gas, as specified in FSM 1922.36. Information and guidance for oil and gas is contained in the "Environmental Assessment for Oil and Gas Leasing Proposals," Pacific Northwest Region, April 1981.
3. Hydroelectric--Forest Plans will assess known potential for developing hydroelectric facilities, including pumped storage sites and transmission needs. Basic information on hydroelectric potential is listed in the Pacific Northwest River Basin report, "Water Today and Tomorrow," issued June 1979.
4. Solar and Wind Generation Sites--Forest Plans will assess the known potential for developing sites for electrical generation facilities using wind or solar energy.

5. Geothermal--Forest Plans will assess the known potential for exploring and developing geothermal resources, as provided in Chapter 1922.36 of the Forest Service Manual.
6. Transmission Facilities--See Standards and Guidelines for transportation and utility corridors.

Old-Growth Timber

Old growth is typically thought of as a plant community made up of very large trees and other related vegetation that has no visible evidence of human activities and may be several hundred years old. In the Pacific Northwest, many stands of timber on the National Forests are very old; in the case of Douglas-fir, trees may be as large as 8 feet or more in diameter at eye level and more than 200 feet high. As more and more of the old-growth timber is harvested, maintaining some of the old-growth timber has become a concern.

Specifically, this issue involves where, how much, and what kind of old-growth timber should be maintained on National Forests in the Pacific Northwest Region, and it primarily focuses on those lands currently dedicated to timber production (outside of dedicated wilderness and research natural areas). There are at least three main reasons cited for maintaining old growth: wildlife and plant habitat, ecosystem diversity, and preservation of aesthetic qualities. Those opposed to the retention of old growth are primarily concerned with economic factors and urge rapid conversion of the existing old growth to managed forests of productive, young age classes.

Old-growth timber stands are ecologically important because they represent a successional stage that provides unique habitats for certain species of wildlife. The northern spotted owl is an example of a wildlife indicator species known to be dependent on old-growth habitat. However, other wildlife species, such as the pileated woodpecker, pine marten, and three-toed woodpecker, are also known to rely heavily upon and to reach their optimum population levels in old-growth habitats.

People using the forest for recreation purposes enjoy old-growth trees for their aesthetic and awe-inspiring qualities. Old trees represent a living link with the past and provide an important visual reference to the natural successional processes of the forest environment.

Planning Guidance

1. For all National Forests in the Pacific Northwest Region, an old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics:
 - a) Stands contain mature and overmature trees in the overstory and are well into the mature growth stage (See Handbook of Terminology, Society of American Foresters.)
 - b) Stands will usually contain a multilayered canopy and trees of several age classes

- c) Standing dead trees and down material are present
- d) Evidence of human activities may be present but may not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand

Optimum tract size will be related to the needs of dependent wild-life species, such as northern spotted owls or pileated woodpeckers, and the ability to insulate part of the stand from the edge effects in created openings.

2. This broad definition of old growth is refined by identifying the minimum acceptable stand characteristics associated with the following six timber types found in the Pacific Northwest Region.¹

- a) Spruce-cedar-hemlock (K-1), cedar-hemlock-Douglas-fir (K-2), silver fir-Douglas-fir (F-3), mixed conifers of southwest Oregon (K-5), red fir (K-7), California mixed evergreen (K-29)

At least 60 percent of the overstory canopy level is dominated by large individual trees in some combination of shade-tolerant and shade-intolerant species. The stand will contain some trees with stem diameters 32 inches or greater, an average of two snags per acre, and 30 tons of down logs per acre. Trees will have mature bark characteristics; for example, Douglas-fir will have deeply furrowed bark. Crown height growth will have slowed, giving the tops a more rounded shape; tops may be broken. Limbs will usually be heavy and gnarled, with mosses and lichens often present. Stands in these forest types will be considered old growth until there are fewer than five over-mature trees per acre.

- b) Ponderosa shrub (K-10), western ponderosa (K-11), juniper woodland (K-24)

The stands will contain at least 10 mature to overmature trees per acre, with ponderosa pine or juniper representing 75 percent of the overstory canopy level. Stem size will be at least 21 inches or greater in the overstory tree layer. Broken-topped trees may be present. Ponderosa pine bark will be furrowed and platy, with color ranging from orange to yellow. Overstory canopy closures will seldom exceed 50 percent on good sites and will be fewer than 20 percent on poor sites. There will be a minimum of one standing snag per acre with at least 1.5 tons of down material, including three logs per acre, present.

¹The specific forest component of each timber type is cross referenced to Kuchler (1964) using notation "K-1," etc.

c) Lodgepole pine (SAF 218)

The stands will contain at least 12 trees per acre that are 6 inches or larger in diameter. There will be an average of three snags per acre with at least 3 tons of down material, including three logs per acre. Lodgepole pine will account for at least 60 percent of overstory canopy level. Old-growth characteristics are transitory in this timber type because lodgepole pine is a relatively short-lived species. Individual trees have round to flat-topped crowns and thin to irregular branching, and broken stems are common.

d) Alder-ash (K-25), Oregon oakwoods (K-26), quaking aspen (SAF-217)

Stands will contain at least 15 stems per acre, a minimum of 1 snag per acre, and 1 ton of down material. Mosses and lichens are common in stands west of the Cascade Range.

e) Douglas-fir (K-12), Cedar-hemlock-pine (K-13), grand fir-Douglas-fir (K-14), Western spruce-fir (K-15)

These stands include both shade-intolerant and shade-tolerant timber species. The stands will contain at least 15 trees per acre that are 21 inches or more in diameter, two snags, and at least 3 tons of down material, including three logs, per acre. Broken-topped trees may be present.

f) Fir-mountain hemlock (K-4)

The stands contain a diverse collection of the subalpine forest types found in upper elevations of the Pacific Northwest Region. The stands may be highly defective, with at least five snags per acre and numerous broken-topped trees. Down logs exceed 20 tons per acre. Stands will continue to be considered old growth until there are fewer than five dominant trees per acre.

3. Forest planning will be guided by the following considerations:

- a) Forest Plan inventories for old growth will identify old growth where it occurs, regardless of other overlapping land classifications such as wilderness or productive forest land
- b) Forest Plan alternatives shall address the old-growth issue by identifying levels of old growth for wildlife habitat, ecosystem diversity, and old-growth preservation for aesthetic reasons
- c) Each Forest Plan alternative shall display the effects of implementing the alternative in terms of old growth available for items listed in (b) above, giving consideration to old growth that serves more than one need

American Indian Rights and Interests

National Forests in the Pacific Northwest are located near many American Indian communities and reservations. When the Indian tribes in the Northwest entered into treaties with the United States in the 1800's, the tribes ceded large areas of land, some of which are managed today as part of the National Forest System. In most of these treaties, the tribes reserved the right to fish at the usual and accustomed grounds and stations and the privilege to hunt and gather roots and berries on open and unclaimed lands. National Forest System lands are generally considered to be open and unclaimed lands.

The Forest Service recognizes the rights, interests, and concerns of Indians, and it recognizes that resources of importance to Indians for economic, religious, and cultural purposes can be affected by National Forest management activities. To develop sound working relationships, and to ensure that Indian treaty rights and privileges and religious freedom are appropriately considered in Forest Plans, the following direction will be used.

Planning Guidance. In accordance with FSM 1920.73b, consultation with tribal leaders will take place during the planning process. Forests will seek to involve Indian representatives at various points in the planning process where items of concern to Indians are under consideration. Forest Plan development will include the following steps:

1. The Forests will develop an information base regarding Indian interests in Forest planning and management. At a minimum, the Forests will identify treaties relevant to the Forest, the lands affected by those treaties, the rights reserved by those treaties, and the resources upon which those rights depend.
2. In accordance with FSM 1922.38, cultural resource information developed for Forest Plans will include an inventory of American Indian cultural and religious resources. The Forests will consult with Indian religious leaders and tribes. When inventory information is limited, project plans will consider needs to protect Indian cultural and religious resources.
3. The planning team will review the available land and resource management plans of nearby tribes to determine what effects Forest management may have on those lands or resources.
4. The effects of each alternative on resources of interest to Indian tribes will be considered.

Integrated Pest Management

Integrated pest management (IPM) strategies will be used to prevent and/or suppress pests within the constraints of laws and regulations and to meet resource management objectives. IPM strategies include manual, mechanical, cultural, biological, chemical, prescribed fire and regulatory means. Site-specific strategy selection(s) will be based on environmental analysis.

MONITORING AND EVALUATION

Regional planning is a dynamic process that does not end with implementation of the Regional Guide. Monitoring and evaluation activities provide information to help determine whether or not Forest Service programs are meeting the Guide objectives. It is through this process that corrections and adjustments are made, the quality of implementation is assessed, and the need for change is determined.

Monitoring and evaluation are separate, sequential activities. Monitoring consists of collecting information from selected sources to measure the effects of Forest Service activities. It will provide information about how well programs are operating in terms of program output objectives, expected program costs, and adherence to standards and guidelines.

Areas to be monitored regionally are shown in Table 3-28. Specific actions, effects to be monitored, frequency of measurement, reporting periods, and expected precision and reliability of the monitoring process will be identified in the individual Forest Plans.

In the evaluation stage, information obtained in monitoring is examined with respect to the Regional Guide. Evaluation is the mechanism by which projected outputs and actual outputs can be compared. The Region will use the information provided by Forests, States, and other sources to prepare Regional evaluation reports. The majority of this information will come from Forest monitoring evaluation reports and other existing attainment reporting systems.

Using the existing Forest Service management review process and other less formal means, such as functional assistance trips, the Regional Forester will conduct reviews and examine the degree to which Forest Supervisors are implementing management direction in the Forest Plans and Regional Guide, how well the Forest Supervisors' monitoring and evaluation systems are operating, and the appropriateness of adjustments and revisions.

Changes in the Regional Guide and Forest Plans are accomplished by amendments, revisions, or adjustments to the implementation of plans or programs. The method of change to be used depends upon the significance of the deviation determined by the evaluation. Evaluation results will also be used to determine research needs to improve the Regional and Forest monitoring and evaluation systems.

Table 3-28

Areas To Be Monitored Regionally

Monitoring Category	Actions, Effects, or Resources To Be Measured	Purpose/Reason for Measuring	Sources of Information
Land Condition and Resource Status	Production; capacity; production schedules; development schedules; long-term potential of resources such as timber, range, recreation, wildlife and fish, and visual quality	To determine whether the land and resources are being managed to meet long-term RPA Assessment goals and assumptions To identify and determine management practices and other conditions where insect, disease, other forest and range pests, and natural fuel accumulation situations are occurring that are creating special conditions or hazards to the use of National Forest and National Grassland resources	Forest Plans (including leading management pre-descriptions) and results of monitoring programs; updated RPA research and National Forest System assessment; and State Forest Resource Plans and monitoring results
Program Outputs	Short-term outputs (first 5 years of planning period) Long-term outputs (after first 5 years) for National Forest System and State and private forests and range-lands Total budget expenditures for Forests, State and Private Forestry, and the Regional office	To determine if RPA Program objectives are being met To ensure that Forest Plans consider the full range of capability; to ensure input into the next RPA update To compare actual expenditures with those projected in the Forest Plans and Regional Guides	Management Attainment Report (National Forest System and State and Private Forestry) Forest Plans, Regional Guide, and State Forest Resource Plans Program Accounting and Management Attainment Reporting System (PAMARS); Forest Plans, and the results of monitoring programs
Program Cost	Costs of selected activities by analysis area	To determine whether management costs have been predicted	Forest Plans' projected and actual costs for management practices by analysis area
Physical and Biological Effects	Effects on resources (such as soils, water, air, cultural, visual, threatened and endangered species, and wildlife and fish)	To determine whether effects were as anticipated	Monitoring results of Forest Plans and State Forest Resource Plans

Table 3-28 (Continued)

Monitoring Category	Actions, Effects, or Resources To Be Measured	Purpose/Reason for Measuring	Sources of Information
Social and Economic Effects	Changes in areas such as income and employment; population; market and nonmarket dependency of counties; payments to counties and receipts to U.S. Treasury; energy efficiency; and other trends	To determine whether effects of Forest Service programs were as anticipated and whether Forest Service planning objectives need to change to meet changing socioeconomic conditions	Reports of State agencies (such as Environmental Security or Department of Community Affairs); Forest Plans; results of inventory activities; Forest Service and county fiscal reports; 5-year timber mill census; Regional Energy Management Plan, fiscal reports and other sources, as appropriate
Research Implementation	Application of research results; changes in emphasis in research programs	To determine whether research has helped solve problems; whether research programs and National Forest System and State and Private Forestry perceived research needs are complementary; and whether National Forest System and State and Private Forestry managers are utilizing research results	Research attainment reports, Forest Plan prescriptions, Forest Plan monitoring activities and results, RPA objectives for research work unit descriptions, Regional Guide, Forest Plans, and State Forest Resource Plans
Standards and Guidelines	NFMA standards and guidelines; other standards and guidelines developed through the Regional Guide	To determine how standards are being used and whether expected results are being achieved To determine the level of adherence, effects, and adjustments needed for Regional standards and guidelines	Comments and results of 60-day review, Forest Plan monitoring results, timber management records and reviews, timber sale contracts, and utilization studies
Agency Coordination	Effects of National Forest management on lands, resources, and communities adjacent to National Forest System lands and the effects on National Forest management of activities on nearby lands managed by other Federal Government or State agencies or under the jurisdiction of local government or Indian tribes	To identify coordination needed with other government agencies' policies, plans, and goals To determine whether changes in Forest management activities are needed to lessen impacts on adjacent lands or because of activities on adjacent lands	Forest Plans and results of their monitoring plans; State Forest Resource Plans and results of their monitoring plans Other agency plans and policies, and results of public opinion monitoring

Chapter 4

STATE AND PRIVATE FORESTRY PROGRAM

OVERVIEW

The Forest Service's State and Private Forestry program offers financial, technical, and related assistance to State Forestry organizations and others to support the development of effective and improved forest management, protection, and utilization practices, and to strengthen the capability of each State to manage its forests and related resources.

State and Private Forestry programs include rural forestry assistance on non-Federal forest lands; tree insect and disease management on all forested lands; urban and community forestry assistance; rural fire prevention and control on non-Federal forest lands and other rural lands; management and planning assistance to State Foresters or equivalent State officials; and assistance to ensure that new forestry technology and research results are promptly made available and implemented.

State and Private Forestry also includes certain programs funded by other Federal agencies, but administered by the Forest Service. These include cost sharing for reforestation and timber stand improvement (Agricultural Stabilization and Conservation Service); watershed planning and restoration and flood prevention (Soil Conservation Service); and rural community fire protection (Farmers Home Administration).

The Cooperative Forestry Assistance Act of 1978 authorizes the Secretary of Agriculture to cooperate with and assist the States in implementing Federal programs affecting non-Federal forest lands. State Forestry agencies are the principal delivery system for State and Private Forestry cooperative programs.

1980 RPA PROGRAM FOR STATE AND PRIVATE FORESTRY

The future management situation of the State and Private Forestry program for the States of Oregon and Washington will be guided by the 1980 National RPA Program. The Regional State and Private Forestry program and costs displayed in Table 4-1 are based on State data and information provided for the program alternatives in the 1980 RPA Program and on established allocation procedures developed in cooperation with the National Association of State Foresters. State targets and funding allocations were projected for each State, based on current estimates. While Regional targets are firm, actual State objectives and proposed budgets may be modified during annual program budgeting as new procedures are developed at the national level.

New information developed during State forest resource planning may also modify these allocations. All targets and funding levels are subject to negotiated agreements with individual State Foresters. The RPA targets for Oregon and Washington are displayed in Tables 4-2 and 4-3, respectively.

The base data and information for State and Private Forestry aspects of Forest Service planning are provided by the State Forest Resource Plans. Thus, the 50 States, like the National Forests, will have better information for the 1985 RPA Program Update, which will consider public issues, management concerns, and resource opportunities. The States of Oregon and Washington have prepared their State Forest Resource Plans, which provide an inventory of forest resources, a statement of State issues and concerns, and the State Foresters' proposed program.

The relationship of State and Private Forestry-assigned targets to 12 of the 26 Regional issues is shown in Table 4-4. The remaining 14 issues pertain only to National Forest Lands. State and Private Forestry programs are not related to these issues.

The major thrust in the 1980 RPA Program for State and Private Forestry is the production of wood. Programs that help meet timber targets in an environmentally sound manner will be emphasized.

Technical assistance to timber growers in the Pacific Northwest will concentrate on regeneration following harvest, stand improvement, and marketing. Efforts will be made to motivate landowners to replant lands promptly after harvesting with genetically improved planting stock.

The best opportunities to increase softwood supplies are on private non-industrial forest land. The leveling off of harvests from industrial land emphasized the importance of nonindustrial private land. It is here that much of the increased demand for softwood would be met through increased harvest and reforestation.

The goal is to boost reforestation from the current level of nearly 6,000 acres per year to more than 11,500 acres by 1985, and to nearly 17,500 acres by 2030. Acreage receiving cultural treatment would follow a similar pattern by increasing to nearly 19,000 acres by 1985 and 22,000 acres by 2030.

Estimated additional wood volume available through improved utilization would increase to 31 million cubic feet by 1985 and 51 million cubic feet by 2030. Existing technical assistance programs, various financial incentives, and other alternatives would be studied to determine how nonindustrial private landowners could most effectively be encouraged to produce timber and other renewable resources.

Table 4-1
1980 RPA State and Private Forestry Program Outputs, Activities, and Costs
for the Pacific Northwest Region

Program Element and Activity	Unit of Measure	Annual Units									
		1981	1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Recreation											
Cooperative Technical Assistance for Dispersed Recreation	Thousand Acres	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04
Wildlife and Fish											
Cooperative Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Range											
Cooperative Technical Assistance for Forage Production	Thousand Acres	0.8	0.9	1.1	1.3	1.5	1.5	1.5	1.6	1.6	1.6
Timber											
Reforestation (RPA, FIP, ACP)	Thousand Acres	5.8	9.6	10.0	11.3	11.8	12.5	13.7	15.4	16.6	17.4
Timber Stand Improvement (RPA, FIP, ACP)	Thousand Acres	11.6	15.4	16.4	18.1	19.1	19.6	20.8	21.0	21.4	21.8
Timber Prepared for Harvest	M Cubic Feet	36.0	40.9	45.9	50.8	55.8	55.8	55.8	57.0	58.5	60.0
Woodland Owners Assisted	Thousand Owners	2.7	3.3	3.9	4.5	5.2	5.3	5.4	5.4	5.4	5.5
Improved Utilization of Wood	M Cubic Feet	18.0	21.2	24.5	27.7	31.0	34.0	38.0	42.5	47.0	51.0
Protection											
Insect and Disease Management Surveys											
Federal	Million Acres	16	17	18	19	19	20	20	21	21	21
Non-Federal	Million Acres	15	15	17	19	20	20	20	20	20	20
Total	Million Acres	31	32	35	38	39	40	40	41	41	41
Rural Community Fire Protection	M Applications Approved	-	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12
Fire Loss on Protected Areas	Thousand Acres Burned	17.4	15.3	14.6	14.1	13.2	13.2	13.2	13.2	13.2	13.2
Water, Minerals, Land, and Soils											
State Forest Resource Planning	Million Acres	1.8	2.0	3.0	5.4	6.0	6.0	6.0	6.0	6.0	6.0
Cooperative Technical Assistance for Landowner Forest Management Plans	Million Acres	0.18	0.20	0.23	0.26	0.29	0.26	0.21	0.21	0.21	0.21
Cooperative Technical Assistance	Person Years	1.0	1.5	2.0	2.5	3.0	3.0	3.0	2.5	2.5	2.5
Work Force	M Staff Years	0.04	0.05	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.08
Costs--State and Private Forestry ¹ (\$5PF)											
Capital Investments ²	Million Dollars	3.1	4.0	4.5	4.9	5.4	5.6	5.7	5.9	5.8	5.7
Total Appropriated ³	Million Dollars	1.2	2.1	2.1	2.4	2.5	2.9	3.0	3.0	3.0	3.0
Allocated ⁴	Million Dollars										
TOTAL \$5PF	Million Dollars	4.3	6.1	6.6	7.3	7.9	8.5	8.7	8.9	8.8	8.7

All costs are shown in constant 1978 dollars.
¹\$5PF capital investments include activities such as reforestation, timber stand improvement, preparation of landowner forest management plans, cooperative forest resource planning, insect and disease surveys, fire management planning, and fuel treatment.
²Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.
³Projected estimates of funds appropriated to other USDA agencies for programs that receive assistance from the Forest Service and State forestry agencies, including forestry practices under the Agricultural Conservation Program and the Forestry Incentives Program, funded through the Agricultural Stabilization and Conservation Service; rural community fire protection, funded through the Farmers Home Administration; and funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys, and resource conservation and development.
⁴NOTE: Abbreviations Used in Table: RPA=Rural Forestry Assistance; FIP=Forestry Incentives Program; ACP=Agricultural Conservation Program.

Table 4-2

1980 RPA Annual Program Display for the State of Oregon

Program Element and Activity	Unit of Measure	Base Year 1978	Annual Units					
			1981	1982	1983	1984	1985	1995
Recreation Cooperative Technical Assistance for Dispersed Recreation	Thousand Acres	0	0	0	0	0	0	0
Wildlife and Fish Cooperative Technical Assistance for Forage Production	Thousand Acres	0	0	0	0	0	0	0
Range Cooperative Technical Assistance for Forage Production	Thousand Acres	0.8	0.9	1.1	1.3	1.5	1.5	1.5
Timber Reforestation (RFA, FIP, ACP)	Thousand Acres	3.4	5.7	5.9	5.9	6.1	7.1	7.1
Timber Stand Improvement (RFA, FIP, ACP)	Thousand Acres	9.7	12.9	13.8	14.3	15.1	16.4	16.4
Timber Prepared for Harvest	M Cubic Feet	16.9	19.2	21.6	23.9	26.2	26.2	26.2
Woodland Owners Assisted	Thousand Owners	1.5	1.6	1.9	2.2	2.5	2.5	2.5
Improved Utilization of Wood	M Cubic Feet	5.0	5.9	6.9	7.8	8.7	11.4	11.4
Protection Insect and Disease Management Surveys	Million Acres	10.4	10.9	11.6	11.7	12.2	12.8	12.8
Federal	Million Acres	7.0	7.0	8.0	9.6	9.6	9.6	9.6
Non-Federal	Million Acres	17.4	17.9	19.6	21.3	21.8	22.4	22.4
Total	M Applications Approved	0	0.044	0.044	0.044	0.044	0.048	0.048
Rural Community Fire Protection Fire Loss on Protected Areas	M Acres Burned	7.0	6.2	5.8	5.6	5.3	5.3	5.3
Water, Minerals, Lands, and Soils State Forest Resource Planning	Million Acres	0.9	1.0	1.5	2.7	3.0	3.0	3.0
Cooperative Technical Assistance for Landowner Forest Management Plans	Million Acres	0.13	0.15	0.17	0.19	0.21	0.21	0.21
State and Private Forestry Appropriated Funds	Thousand Dollars	671.4	992.1	1,089.1	1,224.5	1,350.9	1,402.6	1,402.6
Allocated Funds	Thousand Dollars	61.0	172.0	180.0	220.0	240.0	374.0	374.0
TOTAL All Funds	Thousand Dollars	732.4	1,164.1	1,269.1	1,444.5	1,590.9	1,776.6	1,776.6

NOTE: Abbreviations Used in Table
RFA=Rural Forestry Assistance
FIP=Forestry Incentives Program
ACP=Agricultural Conservation Program

Table 4-3
1980 RPA Annual Program Display for the State of Washington

Program Element and Activity	Unit of Measure	Base Year 1978	Annual Units				
			1981	1982	1983	1984	1985
Recreation							
Cooperative Technical Assistance for Dispersed Recreation	Thousand Acres		0.02	0.02	0.03	0.03	0.04
Wildlife and Fish							
Cooperative Technical Assistance for Wildlife Habitat Improvement	Thousand Acres		0.02	0.02	0.02	0.03	0.03
Range							
Cooperative Technical Assistance for Forage Production	Thousand Acres		0	0	0	0	0
Timber							
Reforestation (RFA, FIP, ACP)	Thousand Acres		2.4	3.9	4.1	5.4	5.7
Timber Stand Improvement	Thousand Acres						
(RFA, FIP, ACP)	Thousand Acres		1.9	2.5	2.6	3.8	4.0
Timber Prepared for Harvest	M Cubic Feet		19.1	21.7	24.3	26.9	29.6
Woodland Owners Assisted	Thousand Owners		1.2	1.7	2.0	2.3	2.7
Improved Utilization of Wood	M Cubic Feet		13.0	15.3	17.6	19.9	22.3
Protection							
Insect and Disease							
Management Surveys							
Federal	Million Acres		5.8	5.8	6.4	6.9	7.1
Non-Federal	Million Acres		8.0	8.3	9.0	9.8	10.1
Total	Million Acres		13.8	14.1	15.4	16.7	17.2
Rural Community Fire Protection	M Applications Approved		0	0.056	0.056	0.056	0.062
Fire Loss on Protected Areas	M Acres Burned		10.4	9.1	8.8	8.5	7.9
Water, Minerals, Lands, and Soils							
State Forest Resource Planning	Million Acres		0.9	1.0	1.5	2.7	3.0
Cooperative Technical Assistance for Landowner Forest Management Plans	Million Acres		0.05	0.05	0.06	0.07	0.07
State and Private Forestry							
Appropriated Funds	Thousand Dollars		646.8	970.0	1,109.0	1,254.6	1,402.5
Allocated Funds	Thousand Dollars		34.0	155.0	165.0	212.0	263.0
TOTAL All Funds	Thousand Dollars		680.8	1,125.0	1,274.0	1,466.6	1,665.5
							1,867.0

NOTE: Abbreviations Used in Table
RFA=Rural Forestry Assistance
FIP=Forestry Incentives Program
ACP=Agricultural Conservation Program

Table 4-4

The Relationship of the State and Private Forestry Program Elements to the Regional Issues

Regional Issues	Program Elements													
	Cooperative Tech. Assistance for Dispersed Recreation	Cooperative Tech. Assistance for Wildlife Habitat Imp.	Cooperative Tech. Assistance for Range Improvement	Reforestation	Timber Stand Improvement	Timber Prepared for Harvest	Woodland Owners Assisted	Improved Utilization of Wood	Insect and Disease Management Surveys and Tech. Assistance	Rural Community and Fire Protection	Fire Loss on Protected Area	State Forest Resource Plan	Landowner Forest Mgmt. Plans	Cooperative Tech. Assistance
Riparian Areas	W	W	X						X			X		
Outdoor Recreation											X			
Municipal Water Supply				X		X				X		X		
Timber/Range versus Wildlife											X		X	
Air Quality and Smoke Management														
Threatened and Endangered Species		W										X		
Anadromous Fish Habitat		W										X		
Use of Chemicals					X				X	X	X			
Timber Supply				X	X	X		X	X	X	X	X		
Intermingled Ownerships									X	X				
Old-Growth Timber									X	X		X		
Private Forestry	W	W	X	X	X	X	X	X	X	X	X	X	X	X

X = Oregon and Washington Activities

W = Washington Activities Only

Chapter 5 RESEARCH

OVERVIEW

The objective of the Forest Service research program is to provide the scientific basis for the management and use of the Nation's renewable natural resources. Research is conducted through a network of eight Regional Forest Experiment Stations and the Forest Products Laboratory at Madison, Wisconsin. Field studies and laboratory research are conducted at 81 locations throughout the United States, Puerto Rico, and the Pacific Trust Territories.

Research programs are planned jointly with the Nation's 61 forestry schools to promote more efficient use of research talents and facilities. The Forest Service, in conjunction with the forestry schools and the Cooperative State Research Service, conducted several research planning sessions during 1977 and 1978 to identify research needs. This effort, which involved more than 1,000 research users, led to the publication of both national and Regional research plans. These plans formed the basis for developing the 1980 RPA research program alternatives.

The following criteria were used to evaluate the RPA research alternatives: research should be responsive to needs for which present technology is inadequate; research should contribute to increased national productivity; research should be responsive to national policies, particularly those enunciated by the Administration and Congress; and, research should relate to changes in demand for technology, but recognize that the course of research should not shift drastically from historical trends.

In the 1980 Recommended RPA Program, research priorities were placed on the following:

1. Improving wood utilization
2. Developing more intensive Forest management practices to increase the Nation's timber supply and to provide biomass for energy
3. Providing new knowledge to deal with current and anticipated environmental issues such as range, arid land, wildlife management, and tropical forestry.
4. Increasing the land manager's stewardship capability in areas such as protection and pollution control

5. Resolving problems identified through the Regional and Forest planning processes

Future research planning will continue to be conducted under the auspices of Title XIV of the Food and Agricultural Act of 1977 and the Forest and Rangeland Renewable Resources Planning Act. Research needs identified through State and Forest Plans and the Regional Guide will be incorporated into future research planning.

REGIONAL RESEARCH PROGRAMS

Forest Service research in the Pacific Northwest Region is planned and conducted by the Pacific Northwest Forest and Range Experiment Station, located in Portland, Oregon. The objective of the research effort of the Pacific Northwest Station is to acquire the knowledge, develop the technology, and disseminate the research findings necessary to manage Pacific Northwest forest and range resources in ways that satisfy demands for goods and services, while maintaining a quality environment. The problems under study at the Pacific Northwest Station are selected with the assistance of land managers, various public agencies, land-use planners, policymakers, environmental groups, and other research organizations. Research results are widely distributed to individuals and to State, Federal, and private organizations through publications, workshops, seminars, and consultation.

Field and laboratory research is carried out by teams of scientists located at Forest Service laboratories in Seattle, Olympia, and Wenatchee, Washington; in Corvallis, Bend, and La Grande, Oregon; and in Alaska and California. Each team or unit is organized for the efficient solution of specific problems.

Forest and range areas specially designated for research activities on National Forests in the Pacific Northwest Region are the Wind River Experimental Forest in Carson, Washington; the Entiat Experimental Forest in Ardenvoir, Washington; the Cascade Head Experimental Forest in Otis, Oregon; the H. J. Andrews Experimental Forest in Blue River, Oregon; the South Umpqua Experimental Forest in Roseburg, Oregon; the Pringle Falls Experimental Forest in La Pine, Oregon; the Bull Run Experimental Watershed in Sandy, Oregon; and the Starkey Experimental Forest and Range in La Grande, Oregon.

In addition, research natural areas have been designated on National Forests and other public lands to protect undisturbed examples of forest and rangeland resources. These areas provide an important information base for gauging effects of management practices on other lands. Efforts are continuing to identify other suitable areas and to formally establish them within the research natural area system.

Current and Planned Research Programs

The present and proposed RPA Research Program for the Pacific Northwest Experiment Station is described below. Table 5-1 summarizes the research program. Portions of research programs by other Forest Experiment Stations and universities relevant to this Guide are also highlighted below. Additional information is available from these organizations.

Table 5-1

RPA Research Program for the Pacific Northwest Forest
and Range Experiment Station
Scientist Years (SY) and Investments (Thousands of Constant 1978 Dollars)

RPA Element	1982 ¹		1985		1990	
	SY	M\$	SY	M\$	SY	M\$
Recreation	2.0	186	5.4	600	6.5	800
Wilderness	0	0	0.4	100	0.5	100
Wildlife and Fish	11.7	1,446	30.0	3,300	37.2	4,300
Range	5.0	650	5.4	600	5.4	600
Timber	40.7	3,658	67.7	6,700	79.0	8,300
Water	14.2	1,212	20.5	2,280	25.6	2,950
Protection	30.9	3,970	44.4	4,900	51.6	6,000
Lands	18.0	3,070	48.9	5,600	57.5	7,400
Soils	1.0	108	4.0	420	4.0	450
Totals	123.5	14,300	226.7	24,500	267.3	30,900

¹Based on actual appropriation.

Recreation

Research in this area emphasizes the development of methods for recreation planning and management for both developed and dispersed recreation resources use, including procedures for assessing the recreation opportunities spectrum, for controlling vandalism, and for managing noise in recreation environments. Studies of recreation use patterns and the relationship of such use to other resource impacts assist recreation management. These studies provide such information as the impacts of recreation activities on water quality and the relationship between recreation activities and wildlife patterns in dispersed areas.

Wildlife and Fish

Wildlife habitat research focuses on the evaluation of forest and grassland habitats and the development of procedures for use by resource managers in assessing habitat qualities and wildlife diversity. Game and nongame habitat relationships are determined, as are big game-livestock forage use interactions.

Livestock grazing, timber harvest, and other land-use impacts on anadromous fish habitat are primary research activities. The effect of natural organic debris in streams on stream ecosystems and the impact of materials deposited by landslides in streams on fish production are elements of a research program concerned with learning how to protect and rehabilitate anadromous fish habitats. A recovery of fish habitat in those streams affected by the Mount St. Helens eruptions is under study. Research needs for the northern spotted owl and its habitat have been identified in Appendix B.

Range

A cooperative range evaluation activity includes research to determine the integrated responses to forested range improvement practices and management. These responses include forage productivity, water yields and quality, wildlife populations, wood yield, visual quality, and the sociological and economic impacts on rural households and communities. Related work focuses on grassland succession and ecology, on symbiotic nitrogen fixation and range productivity, and on livestock management systems, including systems that protect riparian environments.

Timber

Intensive culture of the principal commercial timber species of the Pacific Northwest Region is the overall goal of a broad mix of genetic and silvicultural research activities. Genetic research focuses principally on Douglas-fir and western hemlock, to relate genetic characteristics to site conditions and to develop seed orchard procedures that will increase production of superior stock for reforestation. Improved nursery and planting practices are emphasized along with evaluation of alternative practices for managing competing vegetation. Silvicultural research on Douglas-fir and related west side species is concerned with growth and yield as influenced by factors such as spacing, species mixes, and fertilization treatments, including use of nitrogen-fixing species. In work on ponderosa pine and mixed conifers east of the Cascades, current research is investigating productivity in shelterwood systems and interactions associated with use of prescribed fire, including impacts on vegetation, soil, nutrients, insects, diseases, wildlife, and soil flora and fauna. Research is investigating the ecological characteristics of species found in the Pacific Northwest as a basis for judging productive capacities of forest lands, including those not normally classified as commercial forest lands. Vegetation succession studies are under way in the area devastated by the Mount St. Helens volcanic eruptions.

Energy potential of Regional timber resources is the subject of research investigating methods and costs involved in making available, and using, fuelwood. Biomass inventory, harvesting costs for insect-killed timber, procedures to reduce logging residue creation, and impacts of residue removal are being investigated. In a related effort, utilization research concentrates on the relationship to product recovery of the changing size and quality of the western softwood resource, new processing technology, nontraditional product mixes, and different timber measurement systems. Current work is focused on the product potential of dead softwood timber, in terms of volume and value losses related to time since death, environmental conditions, and products produced.

Forest engineering research is directed toward improvements in cable logging systems to obtain maximum utilization of the Region's timber resource. Some of this work involves improved design and use of yarding carriages and rigging, multispan supports, and artificial anchors. Related work is on residue handling and transport systems. Other engineering research includes developing planning aids that will help timber resource managers and loggers obtain the optimum combination of logging system, road location, span length, and yarder location for a given timber harvest area.



Research in the Pacific Northwest Region provides a scientific basis for management of the National Forests.

Soil and Water

Effects of various land management activities on soil and water resources are determined through research on managed forest and rangeland watersheds both east and west of the Cascades. Current work includes research on nutrient levels and streamflow responses to defoliation, indicator flora for soil climate documentation, and effects of fire on water yields. Related work is concerned with effects of timber cutting on water flows, mass soil movements, and the relation of woody debris to stream channel operations, including channel form and flow characteristics. Numerous studies of erosion action and changes in water yield and quality are under way in the Mount St. Helens blast zone. Research continues to determine effects of introduced chemicals on water quality and fish populations.

Protection

Fire research is concentrated on management of forest fuels, including natural residues and those created by human activities. Impacts of and procedures for use of prescribed fire are emphasized. Other research on residue management includes determination of the effects of alternative residue treatments, development of systems for predicting and measuring forest residues and appraising forest fire hazard, and formulation of guidelines for residue management. Air resource management needs are addressed by research on the air-quality impacts of using fire as a management tool.

Forest insect research is aimed at providing components of integrated pest management systems. Biological control strategies are emphasized, with attention given to insect parasites and arthropod and bird predators, as well as development of natural insect pathogens for use as microbial pesticides. Development of behavioral agents (pheromones) is directed toward insect population monitoring and control programs. Work on integrated pest management strategies for the western spruce budworm is being done in a cooperative research and development program with Canada.

Alternative treatments to lessen the impacts of root rot, heart rot, and dwarf mistletoe on western timber species are sought through forest disease research. Evaluation of impacts of tree wounding during harvesting is an element of this work. In related research, better understanding of and methods to manipulate the beneficial effects of mycorrhizal fungi are sought, with special attention to nursery stock-fungi relations.

Forest Resources Economics and Evaluation

Forest economics research addresses the costs and related results, including local and Regional socioeconomic impacts, of alternative public timber management policies and practices. Examples are investigation of fertilization investments, costs of visual resource protection, Pacific Northwest production-price-employment-trade relationships, projections of economic systems operating in predominantly timber regions, and effects on county expenditure patterns of Forest Service payments in lieu of taxes. Special emphasis is given to the development of a method for projecting Regional demand for National Forest stumpage and prices for individual species.

Related work is concerned with assessing price, employment, and other tradeoffs resulting from changes in world timber markets. The impacts of policies and procedures for selling National Forest timber are being investigated.

Improved assessment of renewable resources is the overall objective of research now expanded from forest inventory to multiresource evaluation. Development of techniques for carrying out resource surveys in Washington and Oregon are part of this effort. Related evaluation work includes development of techniques to identify opportunities to improve market and non-market outputs through resource management, such as intensified timber production through silvicultural manipulation of stocking. Periodically, employment-wood consumption ratios are developed to determine labor productivity changes and to provide a basis for analyzing local employment impacts of changes in timber supplies.

Appendix A GLOSSARY

A

Acre Equivalent. Used to adjust actual acres of habitat improvement or improvement structures to reflect overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species. For example, a single water development for upland game birds has an acre equivalent of 160, whereas a single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big-game animals.

Activity. Actions, measures, or treatments that are undertaken that directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives. Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309.11).

Airshed. A geographical area that, because of topography, meteorology, and climate, shares the same air.

Alternative. One of several policies, plans, or projects proposed for decisionmaking.

Amenity. An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land-use planning to describe those resource properties for which market values (or proxy values) are not or cannot be established.

Anadromous Fish. Those species of fish that mature in the sea and migrate into streams to spawn. Salmon, steelhead, and shad are examples.

Animal Unit. Considered to be one mature (1,000 lb.) cow or the equivalent based upon an average daily forage consumption of 26 lbs. dry matter per day.

Animal Unit Month (AUM). The amount of forage required by an animal unit for 1 month.

Assessment. The Forest and Rangeland Renewable Resource Assessment required by RPA.

Avoidance Area. An area having one or more physical, environmental, institutional, or statutory impediments to corridor designation.

B

Background. The visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand. (See "Foreground" and "Middleground.")

Big Game. Those species of large mammals normally managed for sport hunting.

Biological Growth Potential. The average net growth attainable in a fully stocked natural forest stand.

Biomass. The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or of all the species in a biotic community (community biomass).

Broadcast Burn. Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both.

Brush. A growth of shrubs or small trees usually of a type undesirable to livestock or timber management.

C

CEQ. Council on Environmental Quality.

CFL. Commercial Forest Land. (See "Timber Classification.")

Capability. The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as on the application of management practices, such as silviculture or protection from fire, insects, and disease.

Cavity. The hollow excavated in trees by birds or other natural phenomena; used for roosting and reproduction by many birds and mammals.

Chargeable Timber Volume. The timber removed from regulated forest land that contributes to meeting the annual sustained-yield capacity.

Clearcutting. The harvesting in one cut of all trees on an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield.

Climax. The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

Climax Species. Those species that dominate the stand in either numbers per unit area or biomass at climax.

Coastal Douglas-Fir Zone. The area west of the crest of the Cascade Mountain Range in the States of Oregon and Washington.

Commercial Forest Land (CFL). See "Timber Classification."

Commodity. A transportable resource product with commercial value; all resource products that are articles of commerce.

Concern. A point, matter, or question raised by management that must be addressed in the planning process.

Congressionally Classified and Designated Areas. Areas that require congressional enactment for their establishment, such as national wildernesses, national wild and scenic rivers, and national recreation areas.

Consumptive Use. Those uses of a resource that reduce its supply.

Core Area. (As related to the spotted owl). An area encompassing at least 300 contiguous acres of old growth suitable for nesting and reproduction. The area consists of a pair's territory, in part, the nest site, and principal roost areas.

Corridor. A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries.

Cost Efficiency. The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values, but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

Created Opening. Created openings are openings in the Forest created by the silvicultural practices of shelterwood regeneration cutting at the final harvest, clearcutting, seed tree cutting, or group selection cutting.

Critical Window. A control point or area (such as a mountain pass) not to be designated within an existing utility corridor, but needed to retain future new utility corridor options.

Cultural Resources. The remains of sites, structures, or objects used by humans in the past--historical or archaeological.

D

d.b.h. Diameter at breast height. The diameter of a tree measured 4 feet 6 inches from the ground.

d.i.b. Diameter inside bark.

Decision Criteria. Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decisionmaker in identifying a preferred choice from an array of possible alternatives.

Density Biological Population. The number or size of a population in relation to some unit of space. It is usually expressed as the number of individuals, or the population biomass per unit area or volume.

Designated Area (Air Quality). Those areas delineated in the Oregon and Washington Smoke Management Plans as principal population centers of air-quality concern.

Desirable Residual Vegetation. The remaining vegetation after application of harvest cutting methods that meets management area objectives. The vegetation may be trees, shrubs, grass, or a combination.

Developed Recreation. Recreation that requires facilities that, in turn, result in concentrated use of an area. Examples of recreation areas are campgrounds and ski areas; facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings.

Dispersed Recreation. A general term referring to recreation use outside a developed recreation site; this includes activities such as scenic driving, hunting, backpacking, and recreation in primitive environments.

Dispersion Evaluation Area. An area of land defined by topographic features, such as stream drainages, that are typically 2,000 to 5,000 acres in size, but do not exceed 10,000 acres.

Diversity. The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. See also "Edge," "Horizontal Diversity," and "Vertical Diversity."

Douglas-Fir Type. An association of tree species in which Douglas-fir is recognized as one of the principal seral species.

E

East Side Forests. The 10 National Forests of the Pacific Northwest Region that lie east of the Cascade Mountain Range crest (Colville, Deschutes, Fremont, Malheur, Ochoco, Okanogan, Umatilla, Wallowa-Whitman, Wenatchee, and Winema National Forests).

Ecosystem. An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

Ecotone. The area influenced by the transition between plant communities or between successional stages or vegetative conditions within a plant community.

Edge. Where plant communities meet or where successional stages or vegetative conditions within plant communities come together. See also "Edge Contrast" and "Horizontal Diversity."

Edge Contrast. A qualitative measure of the difference in structure of two adjacent vegetated areas; for example, "low," "medium," or "high" edge contrast.

Effects. Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in this statement are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508.8).

Endangered Species. Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

Environmental Analysis. An analysis of alternative actions and their predictable short- and long-term environmental effects, incorporating the physical, biological, economic, social, and environmental design arts and their interactions.

Environmental Assessment. A concise public document required by the regulations implementing the National Environmental Policy Act.

Epiphyte. A plant that grows upon another plant and that is nonparasitic. Most of the plant's necessary moisture and nutrients are derived from the atmosphere.

Even-Aged Management. The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clear-cut, shelterwood, or seed tree cutting methods produce even-aged stands.

Exclusion Area. An area having a statutory prohibition to rights-of-way for linear facilities or corridor designation.

Existing Utility Corridor. A strip of land containing one or more existing linear utility rights-of-way, which is or will be designated in Forest planning in order to facilitate future authorization of additional utility rights-of-way.

Extensive Forest Management. A low investment level of management on regulated timberlands that requires initial harvest, regeneration, and final harvest. Some precommercial thinning may be done to prevent stagnation and disease buildup.

F

Floodplain. The lowland and relatively flat areas adjoining inland and coastal waters (including debris cones and floodprone areas of offshore islands) including, at a minimum, those areas subject to a 1-percent or greater chance of flooding in any given year (100-year recurrence).

Forage. All browse and nonwoody plants available to livestock or wildlife for grazing or harvested for feed.

Foreground. A term used in visual management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway. (See "Background," "Middleground.")

Forest Product Utilization (FPU). A program of utilization during the cutting and removal of forest products that have some personal or commercial value.

Forest Residues (Logging). The unused portions of sawtimber and poletimber trees cut or killed by logging.

Forest Types. A classification of forest land based upon the tree species presently forming a plurality of basal area stocking in live trees.

Free-to-Grow. A term used by silviculturalists to indicate that trees are free of growth restraints, the most common of which is competing over-topping vegetation.

Further Planning Areas. Areas designated by the RARE II process for further study to determine their use for wilderness or other resource management and development. This will be done during the development of the Forest Plans.

G

Genetic Integrity. Refers to a normal, healthy genetic pool (foundation) within a biological population to provide for long-term maintenance and survival of the species. Of specific concern in management direction is the prevention of loss of genetic variance (heterozygosity) and the avoidance of inbreeding depression, an important part of a given population's genetic integrity within the gene pool.

Geographic Stretch. A term used to denote the spread (distribution) of active Spotted Owl Management Areas geographically over the range.

Goal. A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.

Goods and Services. The various outputs, including onsite uses, produced from forest and rangeland resources.

Group Selection Cutting. Removal of tree groups ranging in size from a fraction of an acre up to about 2 acres. Area cut is smaller than the minimum feasible under even-aged management for a single stand.

Guideline. An indication or outline of policy or conduct that is not a mandatory requirement (as opposed to a standard, which is mandatory).

H

Habitat. The place where a plant or animal naturally or normally lives and grows.

Harvest Cutting Method. A combination of interrelated actions whereby forests are tended, harvested, and replaced. The combination of management practices used to manipulate the vegetation results in forests of distinctive form and character. Harvest cutting methods are classified as even-aged and uneven-aged.

Herbaceous. An adjective describing seed-producing plants that do not develop persistent woody tissue, but die down to ground level at the end of the growing season.

Heterozygosity. Genetic variance. (Data from natural populations reflect strong support for the theory that heterozygous individuals have a greater viability and often fecundity than do homozygous individuals.)

Horizontal Diversity. The distribution and abundance of plant and animal communities or successional stages across an area of land; the greater the number of communities, the higher the degree of horizontal diversity. This concept is close to, but not exactly the same as, "even-aged management," although each may influence the other. Application of even-aged management, for example, can be designed to accomplish horizontal diversity objectives. See also "Vertical Diversity."

Hydrologic. Pertaining to the quantity, quality, and timing of water yield from forested lands.

I

Inbreeding Depression. In wildlife populations, the occurrence of viable offspring decreases as inbreeding increases. The effects of inbreeding depression can be measured by three means: 1) survival rates--offspring fail to survive to maturity; 2) natality success or fecundity depression--inbred wildlife populations are more likely to be sterile than outbred

populations and inbred parents are poorer parents than outbred parents;
3) sex ratio depression--as inbreeding increases, the male of the species becomes more common among surviving offspring.

Integrated Pest Management. A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

Intensive Forest Management. A high investment level of timber management that envisions initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, precommercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest.

Interdisciplinary Approach. Using individuals representing two or more areas of knowledge and skills focusing on the same tasks, problem, or subject.

Intermingled Ownerships. Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies. Because of early land grants, these lands frequently are in checkerboard ownership patterns.

Irretrievable. Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible. Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long time periods. Irreversible also includes loss of future options.

Issue. A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

K

Kuchler Vegetative Types. Potential natural vegetation of the coterminous United States, classified by Kuchler.

L

Landownership Pattern. The National Forest System resource land base in relation to other landownerships within given boundaries.

Long-Term Sustained-Yield Timber Capacity. The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

M

M. Thousand.

MBF. One thousand board feet. Lumber or timber measurement term.

MM. Million.

Management Concern. An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process.

Management Direction. A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

Management Intensity. A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.

Management Practice. A specific activity, measure, course of action, or treatment.

Management Prescription. Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

Market Resources. Products derived from renewable and nonrenewable resources that have a well-established market value, for example, forage, timber, water, and minerals.

Mass Wasting. A general term for any of the variety of processes by which large masses of earth material are moved downslope, either slowly or quickly, by gravitational forces.

Maximum Modification. See "Visual Quality Objectives."

Mean Annual Increment. The total increment up to a given age divided by that age.

Middleground. The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly from the stand. (See "Foreground" and "Background.")

Minimum Viable Population. The low end of the viable population range.

Modification. See "Visual Quality Objectives."

Monitoring. A process to collect significant data from defined sources to identify departures or deviations from expected plan outputs.

Multiple Use. The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

Municipal Supply Watershed. A watershed that provides water for human consumption where Forest Service management could have a significant effect upon the quality of water at the intake point and that provides water used by a community, or any other public water system that regularly serves at least 25 individuals at least 60 days out of the year or that provides at least 15 service connections.

N

NAAQS. National Ambient Air Quality Standards.

NEPA. National Environmental Policy Act of 1969.

NF. National Forest.

NFMA. National Forest Management Act of 1976.

National Forest System (NFS) Land. Federal lands that have been designated by Executive order or statute as National Forests, National Grasslands, or Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands.

Natural Forest. The forest that would occur on the planning area in 50 years if natural processes were allowed to function without man's influence.

New Utility Corridor. A strip of land containing no existing linear utility right-of-way, but warranting designation as a full corridor.

Nitrogen-Fixing (Nitrogen Fixation). Conversion of free nitrogen into combined forms useful in nutrient cycles and other functions in the biosphere.

Nonattainment Areas. An area that has been identified in the State Implementation Plan where at least one of the national air-quality standards is violated.

Nonchargeable Timber. Timber volume removed from regulated and unregulated forest land that does not contribute to annual sustained-yield capacity.

Nonconsumptive Use. That use of a resource that does not reduce its supply; for example, nonconsumptive uses of water include hydroelectric power generation, boating, swimming, and fishing.

Nondeclining Even Flow. A policy governing the volume of timber removed from a National Forest, which states that the volume planned for removal in each succeeding decade will equal or exceed that volume planned for removal in the previous decade.

Nongame. Species of animals not managed for sport hunting.

Nonmarket. Products derived from National Forest resources that do not have a well-established market value, for example, recreation, wilderness, wildlife.

0

Objective. A concise, time-specific statement of measurable planned results that respond to preestablished goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Off-Road Vehicles (ORV's). Vehicles such as motorcycles, all-terrain vehicles, four-wheel drive vehicles, and snowmobiles.

Old-Growth Stand. An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage; 2) stands will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present; and 4) evidence of man's activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

Optimum Density. For wildlife, the maximum rate of animal stocking possible without inducing damage to vegetation or related resources; may vary from year to year because of environmental and/or population factors.

Output. The goods, end products, or services that are purchased, consumed, or used directly by people. Goods, services, products, and concerns produced by activities that are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. A broad term for describing any result, product, or service that a process or activity actually produces.

Overmature. The stage at which a tree declines in vigor and soundness, for example, past the period of rapid height growth.

P

Persons-At-One-Time (PAOT). The number of people in an area or using a facility at the same time. Generally used as "maximum PAOT" to indicate the capacity of an area or facility to support peak usage within established user density standards and without degradation to biophysical resources.

Precommercial Thinning. The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

Prescribed Fire. A wildfire burning under specified conditions that will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Use of unplanned ignitions must have prior approval by the Regional Forester.

Preservation. See "Visual Quality Objectives."

Presuppression. Activities organized in advance of fire occurrence to ensure effective suppression action.

Primitive. See "Recreation Opportunity Spectrum (ROS)."

Private Industrial Forest Lands. Lands owned by companies or individuals operating wood-using manufacturing facilities.

Private Nonindustrial Forest Land. Those forest lands owned by companies or individuals who do not own or operate wood-using manufacturing facilities.

Production Potential. The capability of the land or water to produce a given resource.

Public Issue. A subject or question of widespread public interest relating to management of National Forest System.

Public Participation. Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

Purchaser Credit. Credit earned by the purchaser of a National Forest timber sale by construction of contract-specified roads. Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed.

R

Real Dollar Value. A monetary value which compensates for the effects of inflation.

Recreation Capacity. The number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing the quality of the recreation experience or the biophysical resources.

Recreation Opportunity Spectrum (ROS). Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

1. Primitive--Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
2. Semiprimitive Nonmotorized--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.
3. Semiprimitive Motorized--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.
4. Roaded Natural--Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.
5. Rural--Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative

Overmature. The stage at which a tree declines in vigor and soundness, for example, past the period of rapid height growth.

P

Persons-At-One-Time (PAOT). The number of people in an area or using a facility at the same time. Generally used as "maximum PAOT" to indicate the capacity of an area or facility to support peak usage within established user density standards and without degradation to biophysical resources.

Precommercial Thinning. The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

Prescribed Fire. A wildfire burning under specified conditions that will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Use of unplanned ignitions must have prior approval by the Regional Forester.

Preservation. See "Visual Quality Objectives."

Presuppression. Activities organized in advance of fire occurrence to ensure effective suppression action.

Primitive. See "Recreation Opportunity Spectrum (ROS)."

Private Industrial Forest Lands. Lands owned by companies or individuals operating wood-using manufacturing facilities.

Private Nonindustrial Forest Land. Those forest lands owned by companies or individuals who do not own or operate wood-using manufacturing facilities.

Production Potential. The capability of the land or water to produce a given resource.

Public Issue. A subject or question of widespread public interest relating to management of National Forest System.

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Purchaser Credit. Credit earned by the purchaser of a National Forest timber sale by construction of contract-specified roads. Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed.

R

Real Dollar Value. A monetary value which compensates for the effects of inflation.

Recreation Capacity. The number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing the quality of the recreation experience or the biophysical resources.

Recreation Opportunity Spectrum (ROS). Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

1. Primitive--Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
2. Semiprimitive Nonmotorized--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.
3. Semiprimitive Motorized--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.
4. Roaded Natural--Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.
5. Rural--Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative

cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

6. Urban--Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site. Large numbers of users can be expected both on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

Recreation Visitor Days (RVD's). Twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

Reforestation. The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial restocking.

Regeneration. The actual seedling and saplings existing in a stand; or the act of establishing young trees naturally or artificially.

Regulations. Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service.

Residual Stand. The trees remaining standing after some event such as selection cutting.

Residue Loading. The quantity of the unwanted accumulation in the forest of living or dead, mostly woody material that is added to and rearranged by man's activities, such as forest harvest, cultural operations, and land clearing. Forest residue includes slash materials, excessive litter on the forest floor, unwanted living brush and weed trees, and standing dead trees and snags.

Residue Utilization. Removal and use of forest residue (such as slash, litter, brush, dead trees, and snags) for energy production, home heating, or wood products.

Resource Use and Development Opportunities. A possible action, measure, or treatment and corresponding goods and services identified and introduced during the scoping process, which subsequently may be incorporated into and addressed by the Forest Land and Resource Management Plan in terms of a management prescription.

Riparian Area. A geographically delineated area with distinctive resource values and characteristics that is comprised of aquatic and riparian ecosystems. This includes floodplains, wetlands, and all areas within a horizontal distance of approximately 100 feet from the normal line of high water of a stream channel or from the shoreline of a standing body of water.

Roadless Area Review and Evaluation (RARE II). A comprehensive process directed by the Secretary of Agriculture to identify roadless and undeveloped land areas in the National Forest system and to determine their uses for either wilderness or other resource management and development and to determine areas that would require further planning to make such a decision.

Rotation Age. The age of a stand when harvested at the end of a rotation.

RPA. The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the act. The most recent recommended program was completed in 1980.

S

S&PF. State and Private Forestry Assistance Program.

Sanitation Salvage. The removal of dead, damaged, or susceptible trees primarily, essentially to prevent the spread of pests or pathogens and promote forest hygiene.

Saprophyte. A plant living on dead or decaying organic matter.

Saturation Density. (Same as tolerance density.) Intraspecific tolerance permits no future increase. Is most marked in territorial species. Space is the limiting factor to the further increase of this population density.

SCORP. Statewide Comprehensive Outdoor Recreation Plan.

Second Growth. Forest growth that has come up naturally after some drastic interference (for example, wholesale cutting, serious fire, or insect attack) with the previous forest growth.

Semiprimitive Motorized ROS Class. See "Recreation Opportunity Spectrum."

Semiprimitive Nonmotorized ROS Class. See "Recreation Opportunity Spectrum."

Sensitive Species. Those species that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists.

Seral. A biotic community that is a developmental, transitory stage in an ecological succession.

Series. A level of vegetation classification that is identified by the most common species found in the tree, shrub, and/or herbaceous layer of a plant community. Series is a subdivision of a subformation.

Shade-Intolerant Plants. Plant species that do not germinate or grow well in shade.

Shade-Tolerant Plants. Plants that grow well in shade.

Silviculture. The art and science of controlling the establishment, composition, and growth of forests.

Skyline Deflection. The distance a skyline cable drops below line of sight during the yarding operation.

Skyline Logging. A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

Skyline Tailhold. Anchors consisting of stumps, trees, deadmen, or rock bolts to hold the end of the skyline yarding cable that is opposite the yarding machine.

Slash. The residue left on the ground after timber cutting and/or accumulating there as a result of storm, fire, or other damage. It includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

Small Game. Birds and small mammals typically hunted or trapped.

Socioeconomic. Pertaining to, or signifying the combination or interaction of, social and economic factors.

SOMA (Spotted Owl Management Area). An area containing the home range of one or more owl pairs established for the propagation and protection of the species in accordance with Oregon Spotted Owl Management Plan.

Stand (Tree Stand). An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

Stocking. The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Subsistence Density. A population obtaining enough food for bare survival, but not enough to maintain a healthy population over time. This population density should be regarded as a disaster level.

Successional Stage. A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax; for example, coniferous forests in the Blue Mountains progress through six recognized stages: grass-forb; shrub-seedling; pole-sapling; young; mature; old growth.

Suitability. The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

Suppression. The action of extinguishing or confining a fire.

Sustained Yield of the Products and Services. The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment to the productivity of the land.

T

Thermal Cover. Cover used by animals to lessen the effects of weather; for elk, a stand of coniferous trees 40 feet or more tall with an average crown closure of 70 percent or more.

Threatened Species. Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future.

Timber Classification. Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

1. Nonforest--Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.
2. Forest--Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.
3. Suitable--Commercial forest land identified as appropriate for timber production in the Forest planning process.
4. Unsuitable--Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as not appropriate for timber production in the Forest planning process.
5. Commercial Forest--Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

Timber Harvest Schedule. The quantity of timber planned for sale and harvest, by time period, from the area of land covered by the Forest Plan. The first period, usually a decade, of the selected harvest schedule provides the allowable sale quantity. Future periods are shown to establish that sustained yield will be achieved and maintained.

Timber Production. The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use other than for fuelwood.

Timbershed. A geographical grouping of forest lands that historically have provided logs to a centralized area of use.

Timber Stand Improvement. Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving growing conditions for the remaining trees.

U

Uneven-Aged Management. The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

Unregulated Timber Management. Timber cut from those lands that are not organized to provide sustained yields of timber.

Urban and Other Areas. Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other land-use class.

Utility and Transportation Corridors. A strip of land designated for the transportation of energy, commodities, and communications by railroad, State highway, electrical power transmission (69 kV and above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and telecommunication cable and electronic sites for interstate use. Transportation of minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not to be treated within the Forest Plan effort.

Utilization Standards. Standards guiding the use and removal of timber, which is measured in terms of diameter at breast height (d.b.h.), top diameter inside the bark (top d.i.b.), and percent "soundness" of the wood.

V

Vertical Diversity. The diversity in a stand that results from the complexity of the aboveground structure of the vegetation; the more tiers of vegetation or the more diverse the species makeup (or both), the higher the degree of vertical diversity. This concept is close to but not exactly the same as "uneven-aged management," although each may influence the other. Application of even-aged management, for example, can be designed to accomplish vertical diversity objectives. (See also "Horizontal Diversity.")

Viable Population. The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

Visual Quality Objectives (VQO's). Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

1. Preservation--Ecological change only here.
2. Retention--Human activities are not evident to the casual Forest visitor.
3. Partial Retention--Human activity may be evident, but must remain subordinate to the characteristic landscape.
4. Modification--Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.
5. Maximum Modification--Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Visual Resource. The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

W

West Side Forests. The nine National Forests of the Pacific Northwest Region that lie west of the Cascade Mountain Range crest. They are the Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Olympic, Rogue River, Siskiyou, Siuslaw, Umpqua, and Willamette National Forests.

Wetlands. Areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990).

Wilderness. Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

Wild and Scenic Rivers. Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

1. Wild River Areas--Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
2. Scenic River Areas--Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
3. Recreational River Areas--Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Wildfire. Any wildland fire that is not a prescribed fire. All wildfires require suppression.

Wildland. Uncultivated land, other than fallow, virtually uninfluenced by human activity. It may be neglected altogether or maintained for such purposes as wood or forage production, wildlife habitat, recreation, or protective plant cover.

Windfall. A tree thrown or the stem or other parts (such as branches, foliage, or fruit) broken off or blown down by the wind.

Y

Yarding. The moving of logs from the stump where cut to a central concentration area or landing.

Appendix B

RESEARCH NEEDS — WILDLIFE AND OLD GROWTH

OVERVIEW

The northern spotted owl has demonstrated an affinity for overmature (old-growth) conifer stands that consist primarily of Douglas-firs. With diminishing amounts of old-growth stands, the spotted owl population has decreased to the point that the species is considered "sensitive"; there is a distinct probability that the species could become endangered, unless appropriate management measures are taken. Development of such management plans (all of which involve maintenance for numerous stands of old growth) has indicated that costs, in terms of timber values foregone, will be quite high. Improved information concerning habitat management for the northern spotted owl is needed to ensure that the objectives of the Final Spotted Owl Management Plan are successfully implemented with minimal impact on timber values. The present state of knowledge is insufficient to quantify the trade-offs between spotted owl protection and timber values; consequently, the risk is high that the spotted owl may decline to the endangered status or that constraints on management of old-growth stands may be too stringent.

It is well established that forests are divisible into plant communities, which demonstrate consistencies in composition, successional process, and structure. These forest communities proceed through a succession of distinct phases in the process of moving from bare ground to old growth. Combinations of plant communities and successional stages are two descriptors of habitat that are being used by the Forest Service in its National Fish and Wildlife Habitat Relationships Program. All the successional stages, except old growth, will be in plentiful supply in managed forests.

Old-growth forests are becoming increasingly rare as they are harvested. This trend is expected to continue as these decadent stands are cut and converted to younger, faster growing stands. It is likely that the existence of such stands will become a key issue in meeting the diversity requirements of the National Forest Management Act regulations.

RESEARCH NEEDS

Because the issue of old growth as wildlife habitat is a much broader concern than the appropriate management of the spotted owl alone, research needs should be more broadly defined and categorized under three general areas: describing, classifying, and inventorying old growth; identifying wildlife dependent on old growth and important habitat attributes; and conducting research on species found in old growth.

Describe, Classify and Inventory Old Growth

Once the features of old growth have been examined and described, the descriptions should be used to form the basis of classification of

old-growth areas. Classification is needed to give a rational basis for inventory, research, and management. The inventory will provide information on the amount, size, and distribution of remaining old growth, which is essential data for developing research plans and management alternatives.

Identify Wildlife Species Dependent on Old Growth

Wildlife species that are dependent on or find optimum habitat in old growth must be identified. A comparison should be made between animal communities inhabiting old growth and those that inhabit the closest approximation of managed mature stands within each old-growth classification. These comparisons can then be used to identify those species that occur only in old growth or that find optimum habitat there. Habitat attributes should also be compared between old growth and the closest approximation of managed mature stands within each old-growth classification. The results of these comparisons can then be used in later research or management. These identified attributes can also be used to sharpen definitions of stands that meet old-growth criteria.

Priorities for research on those species that are identified as dependent on old growth or that find optimum habitat in old growth must be established. Those species that are most closely tied to old growth for habitat, that require the largest territories, and that exist in the lowest numbers are those species that are most likely to be identified as "sensitive," and research priorities for those species should be highest. The information derived from defining old-growth attributes and identifying wildlife that is dependent on old growth will be used in setting these priorities.

Conduct Research on Individual Species

The research needed on each species may be quite different, depending on the extent of knowledge of that species. After identifying and establishing a sufficiently high research priority for a species, a detailed research problem analysis will be developed. During that process, the information existing on the species will be summarized, and a research program will be designed to provide needed information and an understanding of that species that is sufficient to devise an appropriate management plan. The research program should include information on the population ecology of the chosen species (including dispersal rates and distances by sex and age category, reproduction and mortality rates, and population densities), current status and location of chosen species, habitat requirements, and competition with other species. Only one species, the northern spotted owl, has been definitely identified for such research.

The northern spotted owl has been identified as probably dependent on old growth; it certainly finds its optimum habitat in old growth. The species also has been identified by the Forest Service as "sensitive," and plans are being developed for its management.

Estimates of a "viable" population are based on population-genetic theory. Conclusions depend, in part, on rates of gene flow throughout the spotted

owl's range, which requires knowledge of dispersal rates and distances by sex and age category. At least 30 birds (adults and young), with radio transmitters attached, should be studied throughout the owl's range. Information about reproduction rates is required to construct realistic models of population dynamics. These models are essential in evaluating different management schemes and population sizes. In addition, information about age at breeding, longevity, and territoriality is needed for constructing population dynamics models and determining potential population densities. It is also essential to know the current status and location of pairs of spotted owls to judge the success of a Spotted Owl Management Plan. While the appropriate techniques for gathering information exist, coordination of such efforts is essential for cost efficiency.

It is critical to define the habitat requirements of the spotted owl. If a spotted owl management area is too small, it will not serve its function. If it is too large, the costs in terms of wood products foregone are increased dramatically. It is, therefore, essential to identify the size and characteristics of the habitat that make it uniquely satisfactory to a pair of nesting spotted owls. Such information will enhance chances of success in creating habitat or in selecting old-growth stands for retention. In addition, owl response to habitat alteration must be determined to define the degree of flexibility that silviculturists have in creating or manipulating habitats. If a given manipulation destroys the usefulness of the habitat, the overall spotted owl management effort is closer to failure. Conversely, the absence of flexibility will be expensive in terms of wood production foregone.

In the case of sensitive, threatened, or endangered species, all limiting factors must be evaluated and considered for management application. Competition is one such factor. The barred owl has been identified as a potential competitor to the northern spotted owl. If the competition within limited habitats is severe, the feasibility of control of competing species should be evaluated. Losses of spotted owls to predators should also be evaluated, and primary predators should be identified. If such losses are significant, the feasibility of predator control within spotted owl management areas should be evaluated.

The genetic variability of the population should be checked periodically to ensure that gene flow throughout the population is satisfactory. This is a way to ensure that the population size is large enough, that habitats are satisfactorily distributed, and that isolated populations are identified.

Research Priorities

Studies on the spotted owl's range, including dispersal rates and distances by sex and age category, and studies relating to the spotted owl's habitat requirements are the highest priorities for research efforts. These studies would also provide information on home range size, nest site locations, breeding success, and clutch size.

FUNDING

Information needs on wildlife and old growth can be funded through administrative studies or interagency research programs. Only limited funding for wildlife and old-growth research now exists within the Forest Service research program. If this source of funding is desired, additional funding must be acquired.

Administrative studies are funded by the management agency (Forest Service or Bureau of Land Management). Administrative studies are carried out by management personnel to provide information needed by management. If the research is of a complex or detailed nature, it is more appropriately carried out by personnel trained and experienced in research. The efforts best suited to administrative studies are those of describing and classifying old-growth stands and monitoring the status of the spotted owl.

Funding for wildlife and old-growth research is also possible through interagency agreement. The Bureau of Land Management can finance such research, and funding may also be possible through the U.S. Fish and Wildlife Service or State agency contributions.

Appendix C
INTERIM DIRECTION — SPOTTED OWL HABITAT MANAGEMENT



United States
Department of
Agriculture

Forest
Service

RO

Reply to

2670 Threatened and Endangered Plants and Animals

Date: **April 20, 1981**

Subject

Spotted Owl Management - Washington Forests

To

**Forest Supervisors, Gifford Pinchot, Mt. Baker-Snoqualmie,
Olympic, Wenatchee NF's**

Your interim (tentative) allocation of spotted owl pairs for which you will manage habitat until your Forest Plan is approved is:

Gifford Pinchot	32
Mt. Baker-Snoqualmie	49
Olympic	17
Wenatchee	14

Other direction sent to you October 28, 1980, (1570/2670) still applies.


R. E. WORTHINGTON
Regional Forester



UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Region 6

P. O. Box 3623, Portland, Oregon 97208

REPLY TO: 1570 Appeals
2670 Threatened and Endangered Plants and Animals

October 28, 1980

SUBJECT: Spotted Owl Management - Washington Forests

TO: Forest Supervisors, Gifford Pinchot, Mt. Baker-Snoqualmie,
Olympic, Wenatchee NF's



We are now in receipt of the Chief's decision regarding an appeal brought against the Region 6 Spotted Owl Management Guidelines. Although the appeal response was directed to the Oregon Forests which have implemented the plan, the planning process which is identified applies Region-wide. This is to clarify direction for spotted owl management interim to Regional and Forest Plan completion.

As a part of the development of the Regional Plan, a new determination will be made of what constitutes a viable population of spotted owls in Region 6. This will be based on an analysis of the current level of information. The Regional Plan will then assign viability numbers, or viability ranges, for Forests to consider as they prepare their Forest Plans.

We expect to complete a preliminary analysis of these viability numbers in November. At that time, a tentative allocation of numbers will be made to Washington Forests which have owls, pending completion of the Regional Plan. These may be updated by numbers provided in the DEIS for the Regional Plan (expected to be available February 15, 1981). Final numbers will be included in the final Regional Plan (expected in August of 1981).

As of the date of receipt of this letter, all confirmed owl pairs under your current inventory will receive protection in accordance with the current Region 6 Spotted Owl Guidelines, which include a 300-acre protection core. Timber sales already advertised are exempted.

Protection for your tentative allocation of owls will be met by July 1, 1981, through either of the following ways:

1. Delineation of SOMAs which have been confirmed to have owl pairs, in accordance with the attached R-6 standards.
2. A combination of confirmed SOMAs and delineated suitable habitat which still needs to be confirmed.

After July 1, 1981, all known or newly-discovered owl pairs will be protected until your tentative allocation can be met by means of condition 1, above.

Protection will be in accordance with Region 6 Spotted Owl Guidelines. The Oregon-Washington Interagency Wildlife Committee is revising these guidelines; the new version will be sent to you upon adoption by the Region. You should use the current version in the meantime.

Amendments to EA's will be made, as necessary, to insure the required protection. We are seeking approval of a timber contract protective clause for "sensitive species" to assist you in responding to this direction.

Under item 1, above, once your tentative allocation has been confirmed, you are not required to protect habitat for owl pairs in excess of that number. However, since your tentative allocation may be revised as the Regional Plan is completed, you should not forego your options to protect owl pairs in excess of the tentative allocation, if it will not impact other programs to do so.

The ultimate result must be that we maintain a viable population of spotted owls, over time, such that we prevent the need for Federal listing.

Contact the Fish and Wildlife Unit if you need to discuss approaches to meet this direction.


R. E. WORTHINGTON
Regional Forester

Enclosure

cc: Jerry McIlwain, WO
Gary Heath, PP&B
Bob Simmons, OGC
Forest Supervisors

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Region 6

P. O. Box 3623, Portland, Oregon 97208

1570 Appeals

REPLY TO: 2670 Threatened and Endangered Plants and Animals September 19, 1980

SUBJECT: Spotted Owl Management - Implementation of Chief's
Direction

TO: Forest Supervisors, Deschutes, Mt. Hood, Rogue River,
Siskiyou, Siuslaw, Umpqua, Willamette, Winema NF's



This is to provide clarification regarding the Chief's decision on an appeal brought against the Region 6 Spotted Owl Management Guidelines, which you have now received.

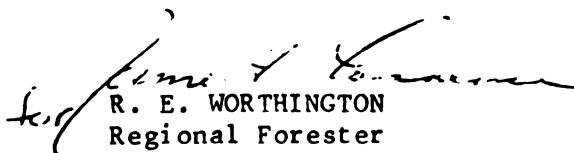
Interim to the approval of the Regional Plan, you are required to manage habitat for your present allocation of owl pairs.

In addition, you are to protect all known or newly discovered owl pairs until your allocation is confirmed. Timber sales sold by October 1, 1980, are exempt. Standards for verifying Spotted Owl Management Areas (SOMAs) and core areas are attached. We are seeking approval from the Chief to implement a timber contract protective clause for a "sensitive species" to enable us to meet this requirement in our FY 81 sales.

To meet the Chief's direction, you are not required to protect owl habitat above the present allocation, once that number has been confirmed. However, the Regional Plan will reassess the question of viability of spotted owls in Region 6 and consider alternative levels of management. You should not forego your options to manage for owl population levels in your Forest Plan other than your tentative allocation in response to public involvement in the Regional Plan E.I.S.

The ultimate result must be that we maintain a viable population of spotted owls, over time, such that we prevent the need for federal listing as threatened or endangered.

Contact the Fish and Wildlife Unit if you need to discuss approaches to meet this direction.


R. E. WORTHINGTON
Regional Forester

Enclosure

cc: Forest Supervisors

C-4

OREGON INTERAGENCY SPOTTED OWL MANAGEMENT PLAN

Objective: To maintain a population of at least 400 breeding pairs of northern spotted owls distributed throughout the known range in Oregon.

1. Maintain habitat to support spotted owl population objective.

11. Develop spotted owl management area (SOMA) program.

111. Establish management area parameters.

1111. Size: a minimum of 1200 contiguous acres per pair (i.e. one home range).

1112. Description of habitat: for each pair there should be a core area of at least 300 acres of old-growth forest maintained to benefit the owls. If 300 acres of old-growth does not exist, then maintain all remaining old-growth and enough of the oldest contiguous or closely adjacent second growth to total at least 300 acres. The remainder of the habitat is to be managed to provide at least 50% of the acreage in stands of 30-plus year forest. Old-growth forest must be at least 200 years old and contain an average of 8-10 old-growth overstory trees (a minimum of four) per acre, with a developed understory greater than 30 years of age.

1113. Number of pairs: the SOMA should encompass the home ranges of a minimum of three to six pairs. Single pair SOMA's are acceptable to improve distribution or where remanent habitat exists.

1114. Proximity of pairs: core areas for each pair should be seperated by approximately 1-3 miles.

1115. Distribution throughout known range.

11151. As a goal, SOMA's of 3 or more pairs should be 8-12 miles apart and single pair SOMA's 5-8 miles apart.

11152. If occupied habitat isn't currently available to meet distributional goals, attempt to manage for it.

112. Determine location of SOMA's.

1121. Inventory statewide historical range for occupied spotted owl habitat.

1122. Recommend minimum nesting pair quota to each agency or landowner.

11221. U.S. Forest Service -290 pairs

11222. Bureau of Land Management - 90 pairs

11223. Other lands * - 20 pairs

* Other includes but is not limited to state (i.e. Forestry, Fish and Wildlife, Parks), county, national park and private lands.

1123. SOMA's can be relocated in the future if such a change benefits the species. The new SOMA must meet the criteria of 111.

12. Develop a management strategy for occupied habitat not included in SOMA's or which is located in the future.

121. It is recommended that spotted owl nest sites that are not included in SOMA's be protected with at least a 5 - chain buffer around the known or suspected nest tree or managed in accordance with agencies policy for raptor nesting habitat.

122. Before modifying the site, consideration should be given to: 1) the need to improve the distribution of older forest ecosystems for all associated plant and animal species; 2) providing insight into management of SOMA's through experimental habitat manipulation.

13. Implement management programs and strategies identified in 11. and 12.

14. Monitor SOMA populations.

2. Develop habitat management alternatives for the spotted owl.

21. Refine knowledge of spotted owl habitat.

211. Determine survival, productivity and recruitment in second growth.

212. Examine habitat utilization in second growth areas.

213. Continue surveys for spotted owls in potential habitat (i.e. old-growth forests).

22. Develop silvicultural practices compatible with maintaining spotted owl populations.

221. Monitor effect of experimental habitat manipulation on spotted owl populations.

2211. Determine survival rate.

- 2212. Determine productivity.
- 2213. Determine relationship to prey base.
- 2214. Evaluate potential of nest boxes, platforms and artificial cavities in second growth.
- 2215. Examine dispersal/interchange of owls between management areas.
- 222. Analyze results of 221 and provide management recommendations.
- 3. Management program administration.
 - 31. Establish coordinator position.
 - 32. Coordinate implementation of management and research program.
 - 33. Information and education.
 - 331. Keep agencies and cooperators informed.
 - 332. Keep public informed.
 - 333. Coordinate program with Washington, California and British Columbia.
 - 34. Review status of management plan at least annually.

Revised 5/79

CB:mcd

5/15/79

**Table C1 — Summary of Spotted Owl Interim
Management Levels
Pacific Northwest Region**

Oregon	Pairs¹
Deschutes	10
Mt. Hood	35
Rogue River	35
Siskiyou	32
Siuslaw	22
Umpqua	40
Willamette	100
Winema	16
	<u>290</u>
Washington	Pairs²
G. Pinchot	32
Mt. B.-Snoq.	49
Olympic	17
Wenatchee	14
	<u>112</u>

¹ Pair density recommended in the revised 1979 Oregon Spotted Owl Management Plan (Appendix C).

² Pair density represents the estimated, minimum viable population (Appendices D and E).

Appendix D

PROCEDURE USED FOR DETERMINING MINIMUM VIABLE POPULATION AND MAXIMUM BIOLOGICAL POTENTIAL FOR SPOTTED OWLS IN THE PACIFIC NORTHWEST REGION

INTRODUCTION

For purposes of the following discussion, a viable population is defined as the number of individuals of a species in natural, self-sustaining populations adequately distributed throughout their region. Viability is a range of population levels, controlled at the lower end (minimum viable level) principally by numbers of individuals, and at the upper end (maximum biological potential) by the availability of suitable habitat.

Natural population levels are a reflection of a complicated interaction of many regulatory factors. The following regulatory factors (in addition to the four assumptions described in the next section) were considered in determining minimum viable levels and maximum biological potentials for spotted owls:

1. Population density--Population levels below a viable density are more prone than populations at optimum densities or carrying capacities to local, if not widespread, geographic extinction with changes in environmental conditions.
2. Natality rate--For many species, there appears to be a population density below which the species fail to reproduce and to recover their total population numbers. When a population falls below this "point of resistance," it loses its ability to recover.
3. Dispersion potential--Species differ in their ability to move and colonize new suitable habitats. Dispersal is important to any given species in order to colonize vacant habitat, prevent overcrowding, promote gene flow, and protect populations from fatal disease outbreaks.
4. Territorialism--Some species, such as the spotted owl, regulate their density by aggressively defending their nesting territories. Consequently, otherwise suitable habitat will not be occupied if it is within the defensive area of an established pair of birds.
5. Habitat suitability--Habitat quality and quantity directly influence population densities, mortality rates, dispersion potential, reproductive success, competition with other species, and other factors.
6. Species adaptability--Species exhibit great differences in their ability to adapt to different habitat types and conditions within types. Animals that accept and thrive in a variety of habitat types and conditions pose few management problems. Conversely, species such as the spotted owl, which have more restrictive habitat requirements, are more vulnerable to changes in environmental conditions.

Assumptions

The following assumptions were used to determine minimum viable levels and maximum biological potentials for spotted owls:

1. Oregon Endangered Species Task Force (OESTF) (now the Spotted Owl Subcommittee of the Oregon-Washington Interagency Wildlife Committee) recommendations on spotted owl numbers and distribution patterns for single-pair and multipair spotted owl management areas (SOMA's) simulate owl numbers and distribution patterns as they occur in nature.

OESTF recommendations are based, in part, on research by Eric Forsman (1975).

2. All old growth displayed on base maps (currently filed in Wildlife and Fish Staff Unit, Pacific Northwest Region, Forest Service) is suitable spotted owl habitat, as described in the revised 1979 Spotted Owl Management Plan (SOMP).

The Chief of the Forest Service specified in his direction that existing data be used to determine viability for the spotted owl. Existing data are displayed on the base maps as developed by the individual National Forests involved. Old growth, as displayed, generally meets the description given in the SOMP. Validation of individual SOMA's will compensate for any discrepancy in this assumption.

3. There will never be more old growth (spotted owl habitat) than that amount that exists today.

The demand for wood products will result in the continued reduction of old growth on lands managed for timber production. In addition, the amount of time necessary for growth will prevent the amount of old growth from increasing in the future.

4. For purposes of maintaining the genetic integrity of the spotted owl in Oregon, Washington, northern California, and southern British Columbia, it is assumed that no distribution barrier between the Olympic Peninsula and the Cascade populations occurs at this time. Also, it is assumed that the Columbia River between Oregon and Washington is not a barrier to the maintenance of genetic integrity.

PROCEDURE USED

Twelve of the Regions' 19 National Forests support spotted owl populations and were included in the population determinations. Washington National Forests included are the Gifford Pinchot, Mt. Baker-Snoqualmie, Olympic,

and Wenatchee National Forests.¹ Oregon National Forests are the Deschutes, Mt. Hood, Rogue River, Siskiyou, Siuslaw, Umpqua, Willamette, and Winema.

National Forest habitat makes up only part of the total spotted owl range. Other major landownerships within the spotted owl range include the public lands under the Bureau of Land Management (BLM), the National Park Service (NPS), State Department of Forestry in Oregon, and State Department of Natural Resources in Washington, as well as private timber industry holdings. Of this group, only the Bureau of Land Management and the National Park Service are committed to providing habitat for spotted owls. Both the Bureau of Land Management and the National Park Service are members of the Spotted Owl Subcommittee of the Oregon-Washington Interagency Wildlife Committee. Numbers and distribution, as provided by the Forest Service, BLM, and NPS, have been coordinated through the subcommittee.

Each National Forest, with the exception of the Willamette (see Appendix E), submitted maps displaying existing old-growth timber in stands greater than 300 acres and below 4,000 feet in elevation. The Oregon Spotted Owl Management Plan (see Appendix F) recommends a core area of at least 300 acres around the nest site. Owl surveys in Washington and Oregon support an upper elevation limit of 4,000 feet. A few owls have been found above 4,000 feet, but habitat above that level is generally considered marginal.

All National Forest old-growth maps were converted to one-quarter-inch-to-the-mile base maps for Washington and Oregon. Mathematically proportioned templates were then constructed and used to plot potential owl populations consistent with available old growth and distribution and density patterns defined for the minimum viable and maximum biological potential population levels.

An additional step was taken in calculating the minimum viable population. Because of troublesome distribution patterns, there was, in some cases, heavy reliance on single-pair spotted owl management areas. Biologists on the Spotted Owl Subcommittee believed that a significant number (perhaps 75 percent or more) of the single pairs would not be viable over time. Therefore, the total number of pairs was increased to offset this predicted failure. The increase was accomplished by adding to the population a number equivalent to 75 percent of the single-pair areas mapped. For example, if a Forest had 3 single-pair SOMA's and 15 pairs in groups of 2 or more, the following treatment was applied:

3 single pairs x 75 percent = 2 additional single pairs

2 additional single pairs + 3 single pairs + 15 grouped pairs = 20 total pairs for the Forest

¹Some spotted owls have been identified on the Okanogan National Forest. The Forest will be providing more information in its Forest Plan.

RESULTS

Maximum Biological Potential

This population level estimates the number of pairs of spotted owls that could exist if all the present spotted owl habitat were occupied. (See Table D-1.) Though it is unlikely that this maximum population level could be achieved, it indicates the high end of the viability scale in accordance with the Oregon Spotted Owl Management Plan. The following criteria were used to determine maximization:

1. Core area per pair--300 acres of old growth
2. Core areas 2 miles apart, measured from edge of core to edge of core
3. Three pairs per SOMA (where possible)
4. Maximum number of core areas per SOMA
5. Two miles between SOMA's

Table D-1

Maximum Biological Potential

National Forest	Number of Pairs
Oregon	
Deschutes	33
Mt. Hood	116
Rogue River	36
Siskiyou	176
Siuslaw	46
Umpqua	173
Willamette ¹	227
Winema	17
TOTAL	824
Washington	
Olympic	109
Gifford Pinchot	165
Mt. Baker-Snoqualmie	229
Wenatchee	38
TOTAL	541
Region TOTAL	1,365

¹See Appendix E.

Minimum Viable Population Level

The following criteria were used in developing the minimum viable populations for each Forest, as shown in Table D-2.

1. Core area per pair--300 acres of old growth
2. Core areas 2 miles apart, measured from edge of core to edge of core
3. Three pairs per SOMA (where possible)
4. SOMA's 12 miles apart, measured from edge of outermost core to edge of outermost core
5. Single-pair SOMA's increased by 75 percent

Table D-2

Minimum Viable Population Calculations

National Forest	Number of Single-Pair SOMA's	75% of Single-Pair SOMA's	Number of Pairs within Multipair SOMA's	Minimum Viable Population
Oregon				
Deschutes	2	2	14	18
Mt. Hood	4	3	23	30
Rogue River	4	3	7	14
Siskiyou	2	2	27	31
Siuslaw	5	4	18	27
Umpqua	2	2	34	38
Willamette	29	22	47	98
Winema	2	2	3	7
TOTAL				263
Washington				
Gifford Pinchot	1	1	30	32
Mt. Baker-Snoqualmie	3	2	44	49
Olympic	0	0	17	17
Wenatchee	7	5	2	14
TOTAL				112
Regional TOTAL				375

Proposed Action and Rationale

As previously pointed out, a minimum viable population is not a desirable or practical density level at which to manage any wildlife population.

Through consultation with Dr. Soule (Soule, M. 1980) and others, it is believed that genetic integrity, that is, maintenance of heterozygosity and avoidance of inbreeding depression, can be maintained within the gene pool of 1,000 adult breeding birds (500 pairs). The critical issue is the maintenance of a distribution pattern that will ensure an intermixing of the total population throughout its range.

Obviously, weak links in the management "chain" are single-pair SOMA's and/or multipair (2-3 pairs) SOMA's in poor habitat. This discussion brings into focus several criteria to consider when developing a recommended alternative for managing spotted owl populations over time:

1. A population must have 500 breeding pairs (1,000 adult individuals) to maintain genetic integrity over time. Five hundred pairs are not an objective, but a standard for testing the objective of managing for a viable population.
2. The importance of providing for a suitable distribution pattern throughout the bird's range becomes paramount. (Suitable distribution is defined in the Oregon Spotted Owl Management Plan, revised 1981.) If distribution is not maintained, requirements for managing viable populations become more stringent, that is, more breeding birds and more intensive management are required and management requirements must be applied to isolated populations instead of to a Regional population.
3. National Forest lands are critical for maintaining a suitable population density and distribution of spotted owls and their habitat on the west side of the Cascades.

It is important to point out that the proposed action and the minimum viable population were not developed through calculations based entirely on scientific data. In some cases, it represents the best expert opinion from biologists and other managers based on their considerations of the above criteria, as well as issues and scientific data discussed in the many meetings and the materials they reviewed.

To meet the intent and direction set forth by Forest Service Policy and the Chief of the Forest Service in the August 1980 decision regarding the Oregon Wilderness Coalition's appeal pursuant to 36 CFR 211.19, the management range of 30 percent above the minimum viable population is a safe approach. It is hypothesized that this management, in addition to the intermixing of owl pairs from other land bases (that is, those of the National Park Service and Bureau of Land Management) that are prudently managed in accordance with the revised 1981 Oregon SOMP, will provide for a self-sustaining population of spotted owls throughout their present range. For comparison of the population densities under the proposed action to

population densities under other actions concerning viability, refer to Tables D-3 and D-4.

The risk of losing viable populations of spotted owls on National Forest system land is highest under current direction (the no action column in Tables D-3 and D-4). The risk decreases as management activities designed to protect the spotted owl increase.

Table D-3

Spotted Owl Population Levels on National Forests
(Pairs)

National Forest	No Action	Minimum Viable Population Level	30 Percent Above Minimum Viable Population Level	Maximum Biological Potential Range
Oregon	290 ¹	263	340	824
Washington	0	112	146	541
TOTAL	290	375	486	1,365

¹Oregon Endangered Species Task Force, 1977 recommended allocation of pairs to National Forest Service in Oregon. Oregon Interagency Spotted Owl Management Plan as revised, 1981.

Table D-4

Comparison of Spotted Owl Population Levels and
Distribution in National Forests
(Pairs)

National Forest	Minimum Viable Population Level	30 Percent Above Minimum Viable Population Level	Maximum Biological Potential Range
Oregon			
Deschutes	18	23	33
Mt. Hood	30	39	116
Rogue River	14	18	36
Siskiyou	31	40	176
Siuslaw	27	35	46
Umpqua	38	49	173
Willamette	98	127	227
Winema	7	9	17
TOTAL	263	340	824
Washington			
Olympic	17	22	109
Gifford Pinchot	32	42	165
Mt. Baker-Snoq.	49	64	229
Wenatchee	14	18	38
TOTAL	112	146	541
Regional TOTAL	375	486	1,365

Appendix E

PROCEDURE FOR CALCULATING WILLAMETTE NATIONAL FOREST'S SHARE OF REGION'S MINIMUM VIABLE POPULATION AND MAXIMUM BIOLOGICAL POTENTIAL FOR THE SPOTTED OWL

Because of a lack of old-growth information, owl numbers for the Willamette National Forest were derived using the following process.

MINIMUM LEVEL

Step 1

Working south from the northernmost boundary of the Willamette National Forest, the template was positioned to enclose as many inventoried spotted owl sightings as possible in the theoretical three-pair spotted owl management areas (SOMA's) and, at the same time, to maintain the minimum distributional spacing (12 miles) between theoretical multipair SOMA's, per the revised 1979 Oregon Spotted Owl Management Plan (SOMP).

Step 2

The January 26, 1981, inventory map delineated proposed SOMA's. The assumption was made that at least a majority of each delineated area (SOMA) was old growth and suitable habitat for spotted owl management.

Based on the estimated acreage of each proposed SOMA, plus the number and the position of spotted owl sightings, biologists estimated, in accordance with the 1979 Oregon SOMP, whether the selected SOMA's were single-pair or multipair.

Based on this procedure, it was estimated that the Willamette National Forest would require 21 multipair SOMA's (47 pairs) and 29 single-pair SOMA's to meet distributional needs of maintaining spotted owls on that National Forest.

MAXIMUM BIOLOGICAL POTENTIAL LEVEL

The maximum biological potential level for spotted owls in the Willamette National Forest was derived using Regional estimates for the number of spotted owls per acre of old growth. The acres of old-growth Douglas-fir in the Regional (Spotted Owl Management) Plan data base for the Mt. Hood and Umpqua National Forests were added together and then divided by their combined maximum potential owl population. This gave a ratio of spotted owls to old growth. The ratio value was then divided into the acres of old growth for the Willamette National Forest, using the old-growth inventory from the Regional Plan data base. The resulting figure became the estimated biological potential population for the Willamette National Forest. The Mt. Hood and Umpqua National Forests' values were used because these Forests border the Willamette on the north and south.

Appendix F
PROPOSED REVISION OF THE OREGON INTERAGENCY
SPOTTED OWL MANAGEMENT PLAN

Date: March 6, 1981

To: Regional Forester, Pacific Northwest Region, Forest Service
Oregon State Director, Bureau of Land Management
State Forester, Oregon Department of Forestry

On November 3, 1977, as chairman of the Endangered Species Task Force, I submitted for your review and approval, a "Spotted Owl Management Plan" for Oregon.

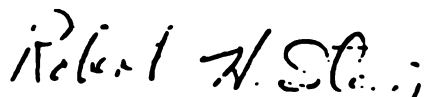
One item in the Plan is to "Refine knowledge of spotted owl habitat." Considerable information pertaining to owl habitat has been gained since 1977. Based on new findings, members of the Oregon-Washington Interagency Wildlife Committee have concurred that proposing a change in the Oregon Plan is appropriate.

Our proposed changes are based, primarily, on studies reported by Eric Forsman. In studies of 14 adult spotted owls conducted since 1975, Forsman demonstrates a home range size variation from 1,356 to 8,352 acres. The minimum old growth forest within a home range is 740 acres. Forsman's "Summary of Radiotelemetry Studies Conducted on Spotted Owls in Western Oregon," dated February 4, 1981 is enclosed.

Our committee is fully aware that timber harvest will be influenced by the recommended increase in the total acres of "old growth" trees to be managed in order to maintain spotted owls at a viable population level. We are aware, also, that additional studies are needed to verify more clearly the habitat requirements for spotted owls. We are convinced, however, that information gained since the original "Spotted Owl Management Plan" for Oregon was written justifies the following recommendation for your consideration:

Habitat conditions contained in the enclosed "Proposed Revision of the Oregon Interagency Spotted Owl Management Plan," dated February 26, 1981, be considered in the planning of timber management on lands under your administration—with the proviso that during the next five-year period (1) 300 acres of old growth forest be maintained for each pair of spotted owls, (2) the forests be managed so that the option to provide 1,000 acres of old growth per pair within a radius of 1.5 miles of nest sites is maintained, (3) a study plan be prepared and executed to identify more clearly the habitat requirements of the owls, and (4) the "Oregon Spotted Owl Plan" be revised at the end of the 5-year period to reflect the knowledge gained from the studies.

We will appreciate your response to this proposal.



R. H. STEIN, Chairman
Oregon-Washington Interagency
Wildlife Committee

Objective: To maintain a population of at least 400 breeding pairs of northern spotted owls distributed throughout the species' range in Oregon.

1. Maintain habitat to support spotted owl population objective.

11. Develop spotted owl management area (SOMA) program.

111. Establish management area (SOMAs) parameters.

1111. Habitat Characteristics

On each site managed for a pair of owls, maintain an old growth core area of at least 300 acres around the nest and an additional 700 acres of old growth within a 1.5 mile radius of the nest. If 1,000 acres of old growth does not exist within a 1.5 mile radius of the nest, then substitute the oldest stands available and manage them in the same manner as old growth.

Old growth stand characteristics will vary from site to site, but objectives should be to maintain dense multi-layered stands on which overstory trees are at least 250 years old, and understory trees range in age from saplings to 200 years old, i.e., uneven aged understory. The salvage of down or dead material should not be conducted in old growth stands managed for spotted owls. Stands intended as replacements for existing old growth stands should be managed to duplicate conditions on natural old growth stands already present in the area.

1112. Number of pairs: the SOMA should encompass the home ranges of at least three pairs. Single pair SOMA's are acceptable only to improve distribution or where remnant habitat exists.

1113. Proximity of pairs: core areas for each pair should be separated by approximately 1-3 miles.

1114. Distribution

11141. As a goal, SOMA's of 3 or more pairs should be less than 12 miles apart and core areas of single pair SOMA's should be less than 6 miles apart.

11142. Maintain pairs of spotted owls uniformly distributed throughout the historic range. Attempt to recreate suitable habitat where spotted owls have been eliminated from portions of their range.

*The attached letter transmitting this Plan to the Forest Service Regional Forester, Pacific Northwest Region; Bureau of Land Management State Director; and Oregon State Forester is considered part of the Plan.

112. Determine location of SOMA's.
 1121. Inventory statewide historical range for occupied spotted owl habitat.
 1122. Recommend minimum nesting pair quota to each agency or landowner.
 11221. U.S. Forest Service - 290 pairs
 11222. Bureau of Land Management - 90 pairs
 11223. Other lands* - 20 pairs

*Other includes but is not limited to state (i.e., Forestry, Fish and Wildlife, Parks), county, national park, and private lands.
 1123. SOMA's can be relocated in the future if such a change benefits the species. The new SOMA must meet the criteria of 111.
12. Develop a management strategy for occupied habitat not included in SOMA's or which is located in the future.
 121. Before modifying the site, consideration should be given to:
 - 1) the need to improve the distribution of older forest ecosystems for all associated plant and animal species;
 - 2) providing insight into management of SOMA's through experimental habitat manipulation.
13. Implement management programs and strategies identified in 11 and 12.
14. Monitor SOMA populations.
2. Develop habitat management alternatives for the spotted owl.
 21. Refine knowledge of spotted owl habitat.
 211. Determine survival, productivity, and recruitment in second growth.
 212. Examine habitat utilization in second growth areas.
 213. Continue surveys for spotted owls in potential habitat (i.e., old growth forests).
 22. Develop silvicultural practices compatible with maintaining spotted owl populations.
 221. Monitor effect of experimental habitat manipulation on spotted owl populations.
 2211. Determine survival rate.
 2212. Determine productivity

- 2213. Determine relationship to prey base.
- 2214. Evaluate potential of nest boxes, platforms, and artificial cavities in second growth.
- 2215. Examine dispersal/interchange of owls between management areas.
- 222. Analyze results of 221 and provide management recommendations.
- 3. Management program administration.
 - 31. Establish coordinator position.
 - 32. Coordinate implementation of management and research program.
 - 33. Information and education.
 - 331. Keep agencies and cooperators informed.
 - 332. Keep public informed.
 - 333. Coordinate program with Washington, California, and British Columbia.
 - 34. Review status of management plan at least annually.

Draft Revision: February 26, 1981

Appendix G NATIONAL FOREST RPA TARGETS IN MILLIONS OF BOARD FEET (MMBF) AND MILLIONS OF CUBIC FEET (MMCF)

Forest		1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Colville	MMBF	103	107	113	119	125	181	191	225	225
	MMCF	25	26	28	29	30	44	47	55	55
Deschutes	MMBF	207	209	209	214	214	214	214	214	214
	MMCF	44	45	45	46	46	46	46	46	46
Fremont	MMBF	155	157	158	165	170	170	170	170	170
	MMCF	28	29	29	30	31	31	31	31	31
Gifford Pinchot	MMBF	487	487	487	482	481	481	481	481	481
	MMCF	93	93	93	92	92	92	92	92	92
Malheur	MMBF	202	210	220	230	241	276	279	279	279
	MMCF	35	37	38	40	42	48	49	49	49
Mt. Baker-Snoqualmie	MMBF	288	296	301	314	322	338	338	343	343
	MMCF	59	61	62	64	66	69	69	70	70
Mt. Hood	MMBF	422	418	418	418	376	376	376	376	376
	MMCF	97	96	96	96	86	86	86	86	86
Ochoco	MMBF	137	140	140	146	150	150	150	150	150
	MMCF	23	24	24	25	25	25	25	25	25
Okanogan	MMBF	82	83	86	94	104	104	104	104	104
	MMCF	17	17	18	19	21	21	21	21	21
Olympic	MMBF	371	371	371	371	360	349	343	343	343
	MMCF	85	85	85	85	83	80	79	79	79
Rogue River	MMBF	216	216	216	216	206	206	198	198	198
	MMCF	41	41	41	41	39	39	38	38	38
Siskiyou	MMBF	203	203	203	203	200	200	200	200	200
	MMCF	40	40	40	40	40	40	40	40	40
Siulaw	MMBF	406	415	424	437	440	444	444	446	446
	MMCF	90	92	94	97	97	98	98	98	98
Umatilla	MMBF	179	183	185	200	205	205	205	205	205
	MMCF	32	33	33	36	37	37	37	37	37
Umpqua	MMBF	393	406	415	423	427	427	427	436	436
	MMCF	73	76	78	79	80	80	80	81	81
Wallowa-Whitman	MMBF	214	215	217	220	220	220	220	220	220
	MMCF	40	40	40	41	41	41	41	41	41
Wenatchee	MMBF	196	198	200	210	210	210	210	210	210
	MMCF	36	36	37	39	39	39	39	39	39
Willamette	MMBF	792	802	812	823	834	869	870	870	870
	MMCF	146	147	149	151	153	160	160	160	160
Winema	MMBF	164	165	165	170	170	170	170	170	170
	MMCF	30	30	30	31	31	31	31	31	31

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